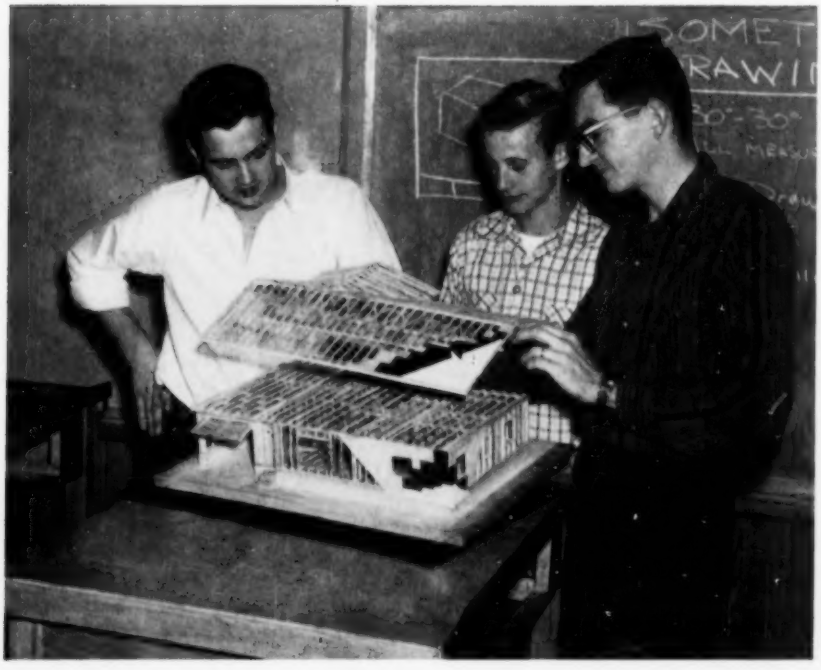
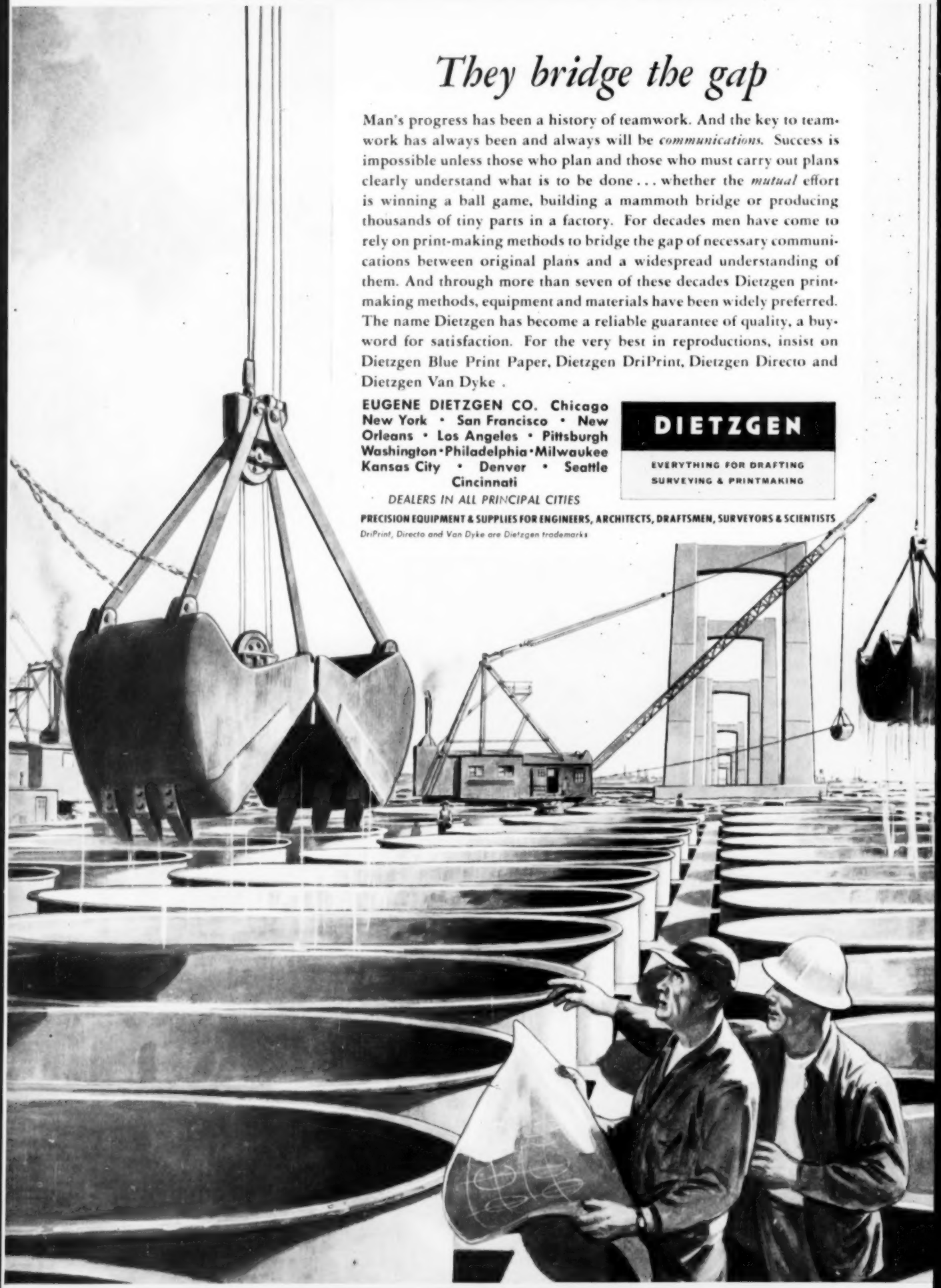
November, 1958 Vol. 47 No. 9

INDUSTRIAL ARTS AND VOCATIONAL EDUCATION

The Shop Teachers' Professional Magazine





They bridge the gap

Man's progress has been a history of teamwork. And the key to teamwork has always been and always will be *communications.* Success is impossible unless those who plan and those who must carry out plans clearly understand what is to be done . . . whether the *mutual* effort is winning a ball game, building a mammoth bridge or producing thousands of tiny parts in a factory. For decades men have come to rely on print-making methods to bridge the gap of necessary communications between original plans and a widespread understanding of them. And through more than seven of these decades Dietzgen print-making methods, equipment and materials have been widely preferred. The name Dietzgen has become a reliable guarantee of quality, a buy-word for satisfaction. For the very best in reproductions, insist on Dietzgen Blue Print Paper, Dietzgen DriPrint, Dietzgen Directo and Dietzgen Van Dyke .

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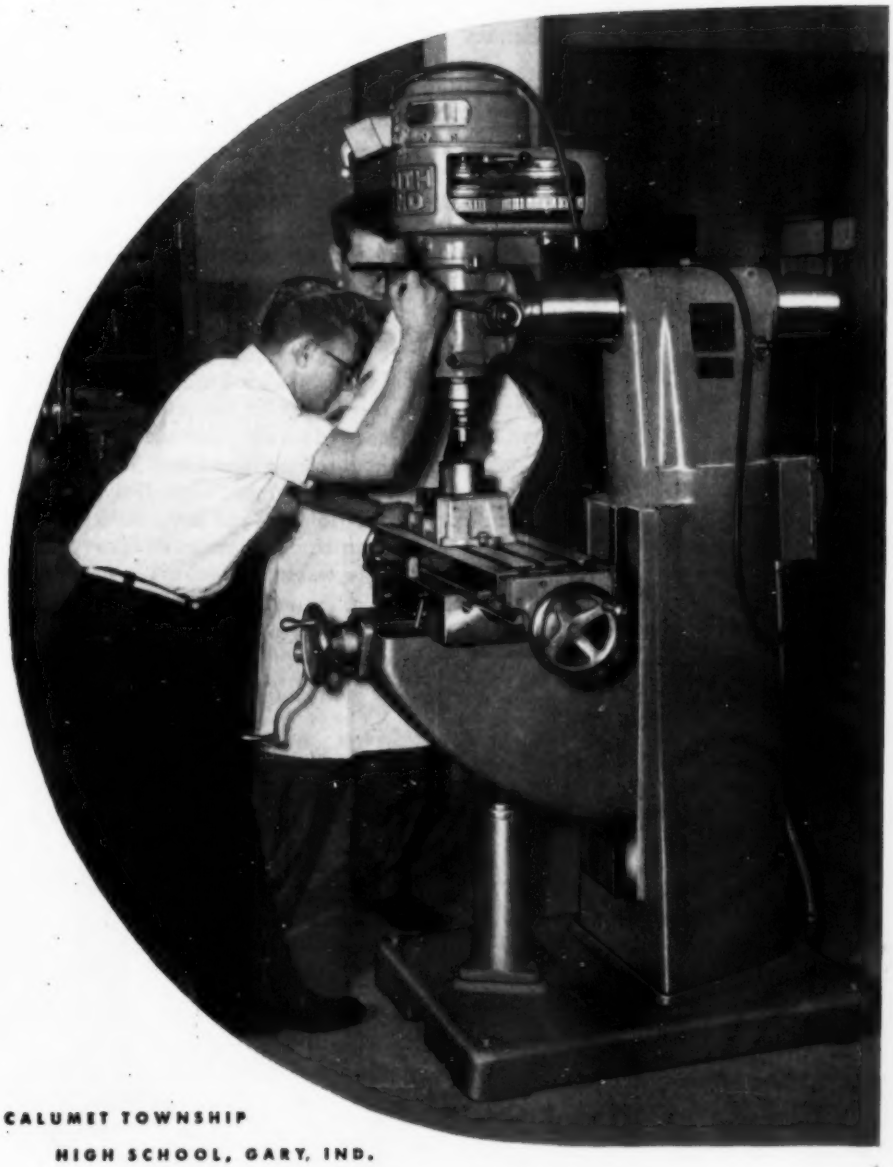

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TAKES ADVANTAGE OF ITS VERSATILITY

This shop, completely equipped with South Bend machines will find that the versatility of the South Bend Vertical Milling Machine gives breadth to training. Students perform more operations and gain more experience as the 360° vertical rotation of the machine head permits it to mill, bore, drill and ream at any angle. Saves set-up time—saves waiting for other machines. Write for complete information on this precision-built mill.

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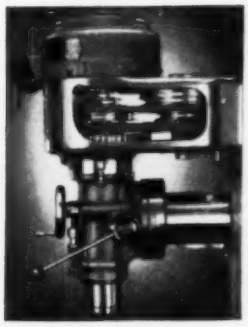

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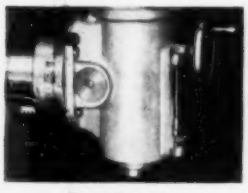

Easy Set-ups

Vernier scale for angular settings. Micrometer depth stop. Quill lock. Large, graduated collars on controls.

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The extreme accuracy, big capacity, and ease of operation of these versatile Walker-Turner "Light-Heavyweights" make them ideal for the school shop. Each unit is safety-engineered for complete student protection and is ruggedly built to take hard usage. And, as their record in industry proves, these "Light-Heavyweights" can't be equalled for long life and low maintenance.

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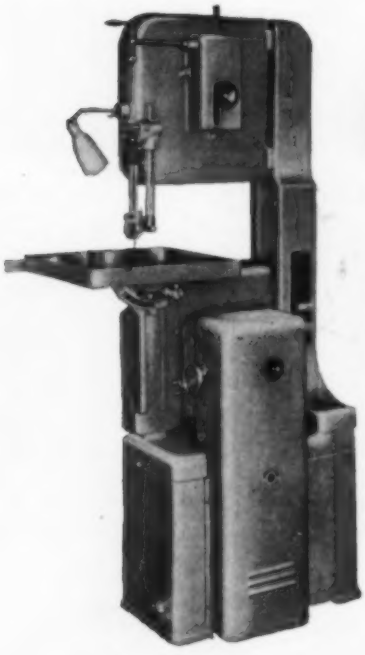

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NOVEMBER
1958

VOL. 47 NO. 9

Industrial Arts and Vocational Education

The Shop Teachers' Professional Magazine

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★ ★ ★

This Month's Cover

Shown on the cover of this issue is a scaled miniature house built by the students of the drawing class at O. Henry Junior High School, Austin, Texas. The instructor is showing the boys the completed project, lifting the roof to expose all details of the house.

For reference to the complete article on this subject see Gerald H. Jones' write-up on "Junior High Draftsmen Become Junior Architects," beginning on page 266 of the October, 1958, issue of this magazine.

★ ★ ★

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Association News

COMING CONVENTIONS

Nov. 1. North Carolina Industrial Arts Association, at Goldsboro, N. C. Secretary, Tom Haigwood, Eastern Carolina College, Greenville, N. C.

Nov. 5–7. Missouri Vocational Association, at Municipal Auditorium, Kansas City, Mo. Secretary, H. H. London, University of Missouri, 202 Industrial Arts Bldg., Columbia, Mo.

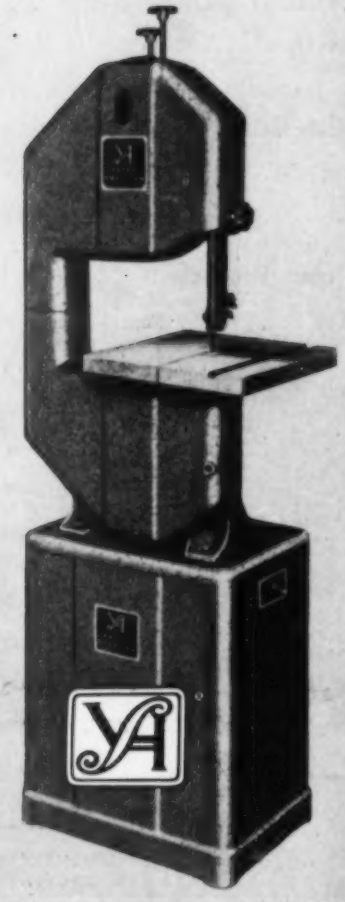
Nov. 6–7. Iowa Industrial Education Association, at Hotel Savery, Des Moines, Iowa. Secretary, Leonard Bengtson, Junior High School, Ames, Iowa.

Nov. 7–8. Kentucky Industrial Education Association, at Kentucky Hotel, Louisville, Ky. Secretary, Alfred H. Meyer, 546 South First St., Louisville 2, Ky.

Nov. 13–15. Mississippi Valley Industrial Arts Conference, at LaSalle Hotel, Chicago, Ill. Chairman, Dr. Verne C. Fryklund, Stout State College, Menomonie, Wis.

Nov. 14–15. New England Industrial Arts Teachers Association, at Eastland Hotel, Portland, Me. Secretary, Edward P. Stach, 1734 Central Ave., Bridgeport 10, Conn.

Modern, Rugged 14" Band Saw



Heavily-ribbed, one-piece frame eliminates vibration and provides sturdy support for work. Adjustments for table tilt, wheel tracking, blade tension, guide placement and changing blades are made from operator's position. The table, supported by double trunnions, tilts 45° right and 10° left. A spring-loaded stop pin quickly resets the table at 90°. Aluminum wheels are covered by hinged doors, and the blade is completely guarded except at point of cut. $191, less motor and controls.

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12" Lathe

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1959 AIAA CONVENTION

The next annual convention of the American Industrial Arts Association will be held in Long Beach, Calif., April 22 to 26, 1959. The exhibit chairman for this convention will be David O. Taxis, industrial-arts consultant for the County of Los Angeles. His address is 808 North Spring St., Los Angeles 12, Calif.

INDUSTRIAL ARTS TEACHERS ASSOCIATION

The Brooklyn Guild

The topics which will be presented at the Brooklyn Guild Meetings of the Industrial Arts Teachers Association of New York City, for the coming months are:

General Theme: "Approach to the Pedagogical Trends in Today's Industrial Arts Education"

October: "Industrial Arts, the Beginning of Technological Education"

November: "Science in Industrial Arts"

January: "Mathematics in Industrial Arts"

February: "How Industrial Arts Vitalizes the School Curriculum"

March: "Teacher-Student Research in Industrial Arts"

April: "The Role of Social Efficiency"

May: "Skills Developed in Industrial Arts"

All meetings are to be conducted at Brooklyn Technical High School.

Newly Elected Officers

The newly elected officers of the Brooklyn Guild are: president — John M. Fontana; vice-president — Harry Berkowitz; treasurer — Philip Weisbard; recording secretary — Alan Schilling; and corresponding secretary — Arthur Katkin.

N. C. PROJECT FAIR A SUCCESS

The North Carolina Industrial Arts Association held its 7th Annual Project Fair at Kiser Junior High School, Greensboro, N. C., on May 16 and 17, 1958. Craftsmanship and creative design were at a high level as more than 375 projects were entered in the various areas of the industries.

Bob McNairy, a Greensboro Senior High student, received the fair's outstanding entry award for his cherry secretary.

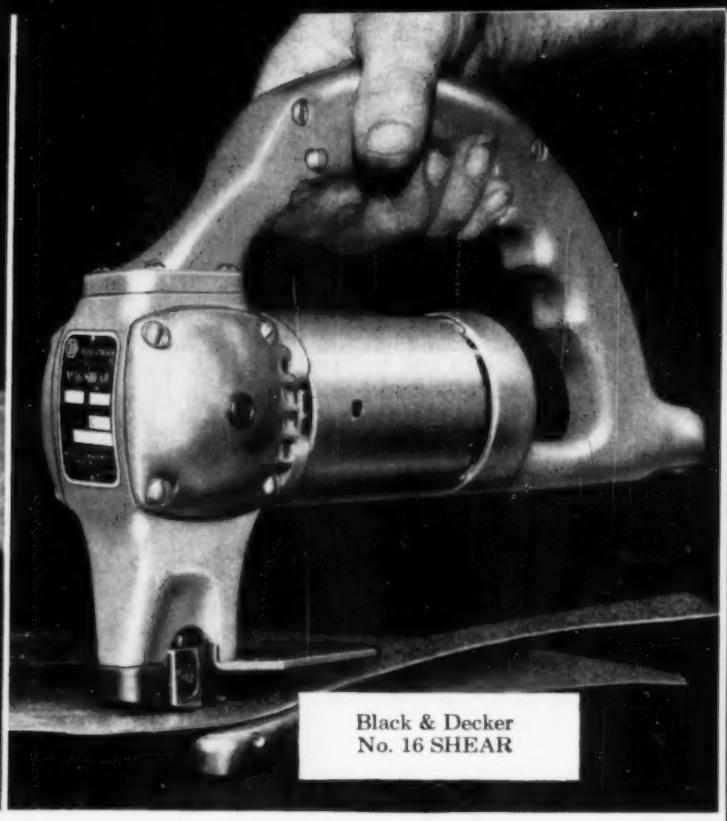
Dr. Kenneth F. Perry, past president of the American Industrial Arts Association and chairman of the Arts Division, Colorado State College, Greeley, Colo., addressed the teachers and student delegates at the Friday evening banquet. Dr. Perry said the industrial arts play a companion role to science in the education of young people. He pointed out that the industrial arts class should be a place where students apply the principles of mathematics and science in the construction of projects.

The Saturday luncheon featured as guest speaker, Dr. Dewey F. Barich, president of the Detroit Institute of Technology, Detroit, Mich. Dr. Barich spoke on the "Importance of Skill." He said skill should be taught an individual whether he uses it as a vocation, a hobby, or to appreciate craftsmanship. Dr. Barich pointed out that ideas are worthless without the technical skill to carry them out.

Kenneth G. Mann of High Point was elected to succeed Tom C. Shore, Jr. of Lexington as president of the N.C.I.A.A. during the business meeting. Other officers elected were: Jesse R. Dills, vice-president, Charlotte; Tom Haigwood, secretary-treasurer, East Carolina College, Greenville; and Carroll Smith, committee member, Laurinburg.

(Continued on page 6A)

Black & Decker
No. 16 NIBBLER



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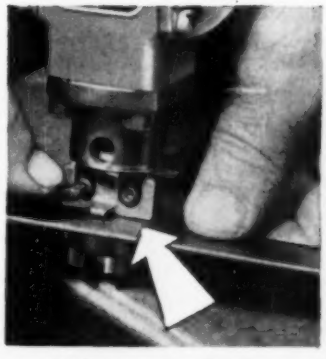
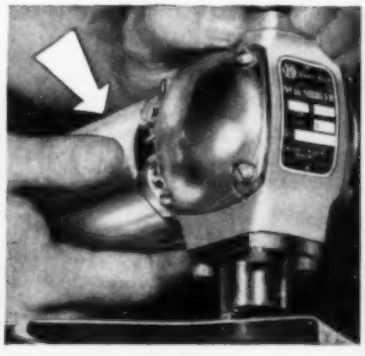
Call your nearby Black & Decker distributor for a free demonstration. For full details on new features, write to: THE BLACK & DECKER MFG. CO., Dept. 4511, Towson 4, Maryland. (In Canada: Brockville, Ontario.)

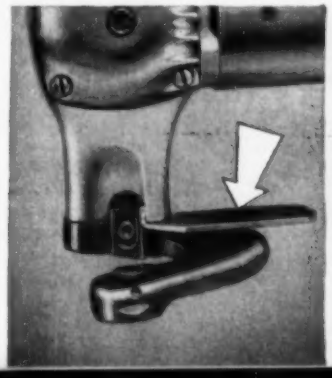
Look Under "TOOLS-ELECTRIC" in Yellow Pages

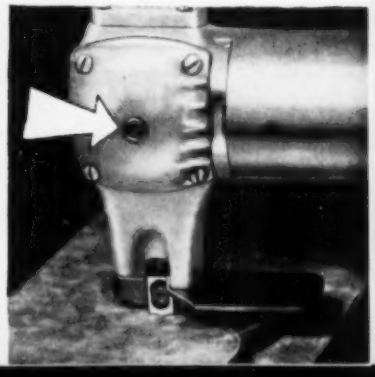




UP TO 3 TIMES FASTER than competition, new B&D Nibbler has twice the life, 20-30% less weight, reversible punch. Adjustable stripper plate (left), smaller diameter (right) are extra features.

50% FASTER than competition, new B&D Shear has one-third less weight than closest competitor, lasts much longer. Deflector plate prevents curling of material. Adjusting screw allows quick positioning of blade.





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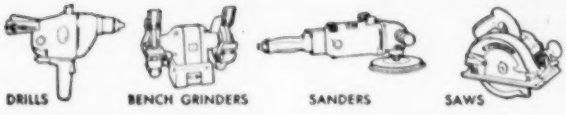


DRILLS BENCH GRINDERS SANDERS SAWS

ASSOCIATION NEWS

(Continued from page 4A)

Extensive educational and commercial exhibits added to the interest of the large attendance at the fair.

CONFERENCE ON OCCUPATIONAL HEALTH AND SAFETY

The second state-wide conference on Occupational Health and Safety was conducted in Albany, N. Y., October 7 and 8, 1958, under the sponsorship of the Governor's Advisory Committee on Industrial Safety and the New York State Department of Labor.

More than 1000 had been invited to the October conference in Albany, including leading representatives of industry and labor, authorities in the field of industrial medicine, insurance companies and state agencies concerned with safety. The two-day program included general discussions and panel meetings on such subjects as programs in construction safety, the human element in industrial accidents, and worker safety and industrial environment.

Among those who addressed the conference were Governor Averell Harriman; Industrial Commissioner Isador Lubin; Harold C. Hanover, president, New York State Federation of Labor; Louis Hollander, president, the New York State CIO Council; and Joseph R. Shaw, president, Associated Industries of New York State, Inc.; and James J. Reynolds, chairman of the Governor's Advisory Committee on Industrial Safety, and vice-president of Alco Products, Inc., Schenectady.

AMERICAN ORTHOPSYCHIATRIC ASSOCIATION

More than 4000 specialists in human behavior, including psychiatrists, psychologists, social workers and educators, are expected to attend the three-day 36th annual meeting of the American Orthopsychiatric Association at the Sheraton Palace Hotel, San Francisco, Calif., beginning March 30, 1959.

This will be the first West Coast meeting of the national professional society, which brings together the key disciplines involved in the team approach to prevention and treatment of behavior problems and related training and research.

A wide variety of topics will be covered in about 60 scientific papers and 40 workshop sessions, with emphasis on social and cultural aspects of mental health, treatment methods and research.

Exhibits of organizations and of materials related to the practice of orthopsychiatry will be on display during the sessions.

Arrangements are being made for attendance by nonmembers.

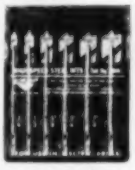
Further information is available from *Dr. Marion F. Langer, executive secretary, American Orthopsychiatric Association, 1790 Broadway, New York 19, N. Y.* or from *Dr. Donald Shaskan, Veterans Administration, 49 — 4th, San Francisco 3, Calif.*

TOP TOOLS FROM A TOP TOOL LINE

PLANES FOR EVERY PURPOSE. Block, Bench, Rabbet and Router planes, all built to the highest standards of design, workmanship and finish. Famous for fast-cutting performance and perfect feel and balance.

TOOL OF A THOUSAND USES! No. 789 Saw-Knife Set. Aluminum handle contains five razor-sharp knife blades . . . also equipped with three saw blades: 9-tooth wood cutting, 18-tooth metal cutting and 24-tooth metal cutting. Cuts anything from soft wood to mild steel.

FINEST POWER BITS MADE! "Dyno-Mite"® high-speed power bits cut clean and fast in hard and soft wood, plastics, plywood — even through ordinary nails and screws in floors or walls. Available separately or in sets of four or six. 3/8", 1/2", 5/8", 3/4", 7/8" and 1".



CUTS MOST ANYTHING — most anywhere. No. 725 "Nest of Saws." Rotatable-blade keyhole saw with two extra blades for metal and wood. Blades lock in eight positions for easy use at any angle. For carpenters, mechanics, plumbers, tinsmiths — everyone who uses a saw.

FOR LIFETIME PERFORMANCE. No. 2 Hand Drill, smooth-acting and powerful. One of the most popular of all Millers Falls hand and automatic drills. A world-wide favorite for years, and unbeatable for value.

SUPER TOUGH! SUPER FLEXIBLE! "Tuf-Flex"® patented alloy steel hacksaw blades famous the world over for all-'round hacksawing use. Teeth will not strip even on the lightest tubing. Lengths and pitches for every purpose.

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WRITE TODAY FOR LITERATURE
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Personal News

APPOINTMENTS TO FACULTY AT IIT

Two associate professors, a lecturer, and three instructors have been named to the faculty at Illinois Institute of Technology, Chicago, Ill., effective September 1, 1958.

They are Associate Professor, Dr. Octave Levenspiel, chemical engineering department; Dr. Raymond R. Mayer, business and economics department; Lecturer Dr. Alva C. Todd, electrical engineering department; Instructors Frank F. Connor, mathematics department; Paul A. Thomas III, architecture department; and Edward J. Voltaggio, mathematics department.

Reginald F. Malcolmson has been appointed acting director and associate professor in the department of architecture following the retirement of former director Ludwig Mies van der Rohe. He is an associate of the Royal Institute of British Architects and an associate member of the Town Planning Institute. He received a master's degree in architecture from Illinois Institute of Technology. He became a member of the faculty in 1949 and was appointed assistant to Mies van der Rohe in 1953.

Dr. George J. Resnikoff has been appointed acting chairman of the department of industrial engineering succeeding former director Dr. Maurice D. Kilbridge. He received his bachelor's degree in mathematics from the University of Chicago and his master's and Ph.D. degrees in mathematical statistics from Stanford University. He joined the faculty of Illinois Tech in 1957.

PHYSICIAN APPOINTED TO U. S. VOCATIONAL POST

The new regional medical consultant in the Office of Rehabilitation of the Department of Health, Education and Welfare is Dr. C. Robert Dean. He was formerly direc-

(Continued on page 16A)

MODEL 1000-C. 4-POSITION WOODWORKING BENCH WITH CABINET BASE AND SHOPTOP. Top is 64 x 54 x 2¼ in. Two-position model has top measuring 64 x 30 x 2¼ in. or 64 x 24 x 2¼ in.

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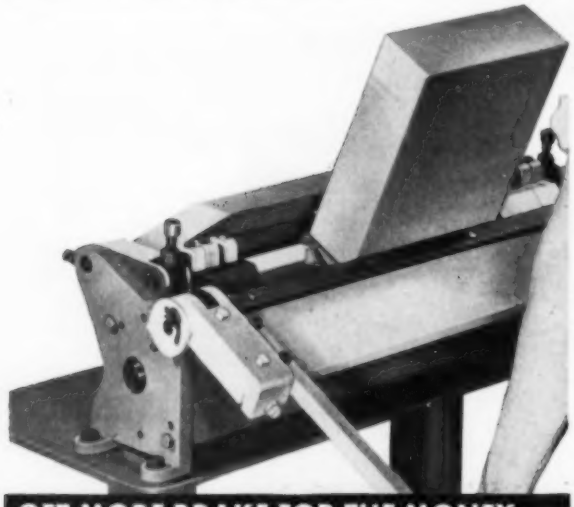
MODEL 1030. MACHINE AND LAYOUT BENCH WITH SHOPTOP. Top is 60x42x2¼ in. or 72x42x2¼ in. or 96x42x2¼ in. Will mount brakes and roll formers needing 42 in.

MODEL 1042. ELECTRICAL BENCH WITH TESTING PANEL, WIREMOLD STRIP AND SHOPTOP. Top: 60x24, 72x24, 60x30, 72x30x1½ in. Other thicknesses optional.

MODEL 1021. STAKE BENCH WITH PIPE RACK, SHELF, STAKE PLATES AND SHOPTOP. Top is 60x42x2¼ in., 72x42x2¼ in. or 96x42x2¼ in. Stake plates 30x8 in.



GET MORE BRAKE FOR THE MONEY...

A Di-Acro Spartan
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BOX and PAN BRAKE

IS THE SAFEST INVESTMENT FOR YOUR SCHOOL TOOL FUNDS

Built to rugged industrial standards and boy-proofed, too, the Di-Acro Spartan Box and Pan Brake with all steel base is a quality investment—it will last longer in your shop. It operates more smoothly and performs a greater number of operations than other brakes. Spartan Model 24 Brakes form 16 gauge steel up to 24" wide with a forming bend of 135°. Deep box fingers form boxes up to 3" in depth. The 5-inch-deep forming bar is rigid and makes forming accurate across its full width.

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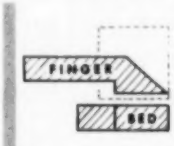

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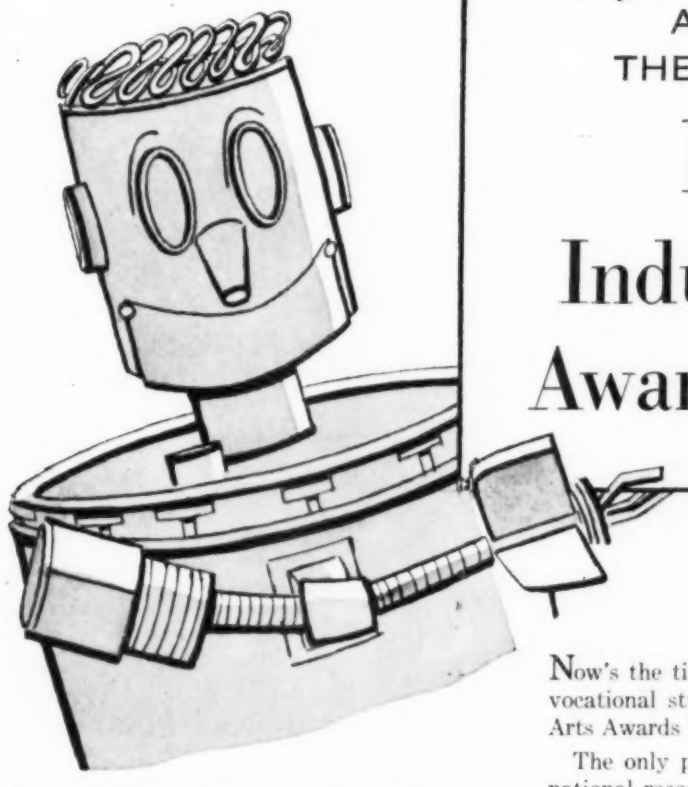

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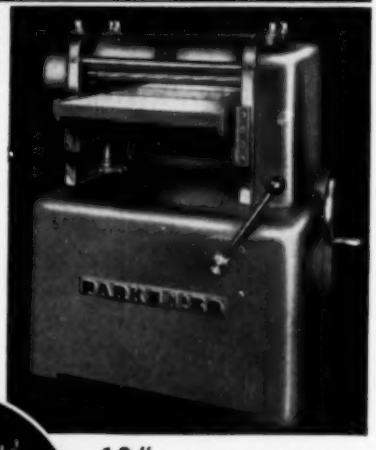

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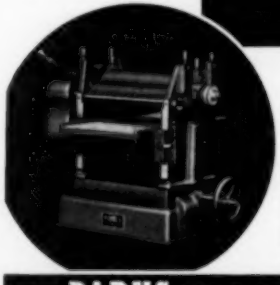

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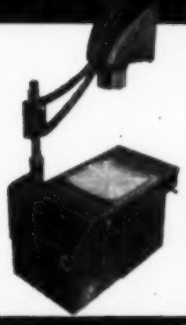

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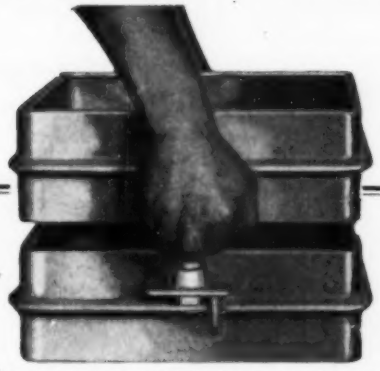

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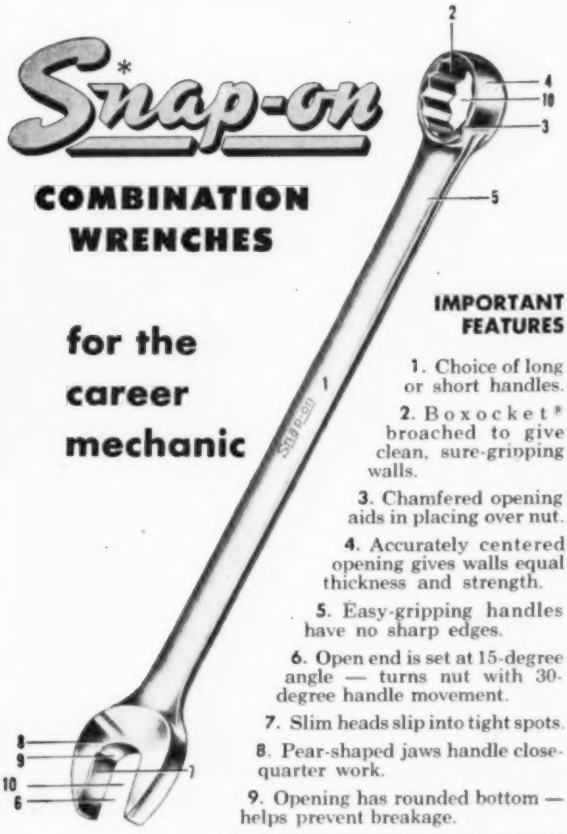

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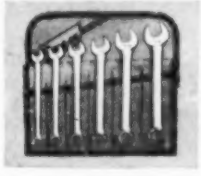

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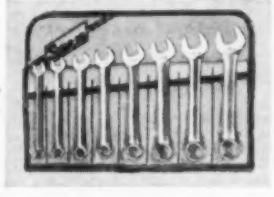

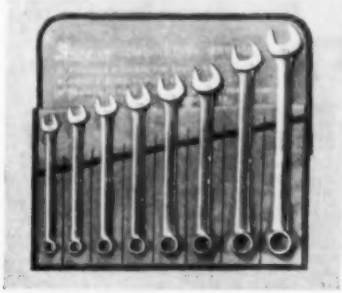

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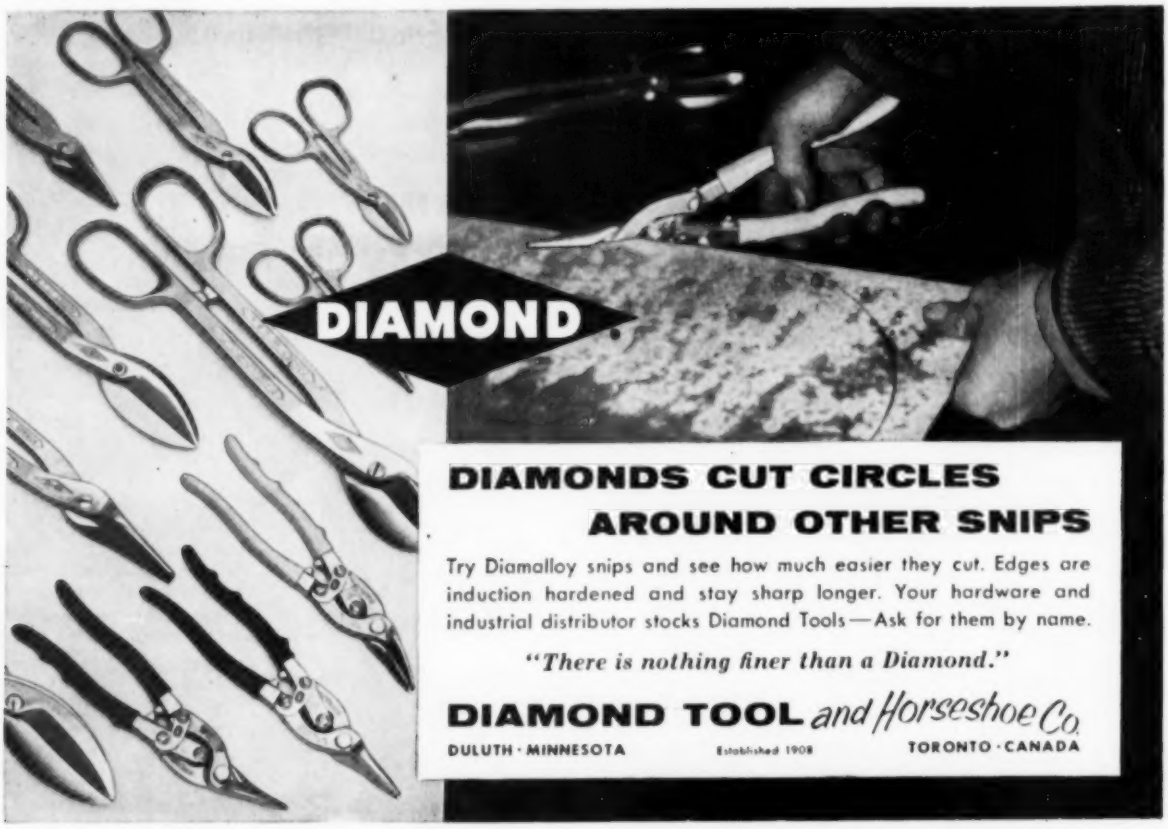

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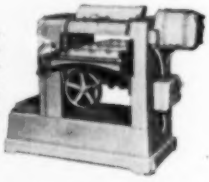

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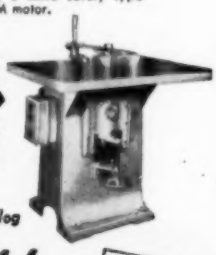

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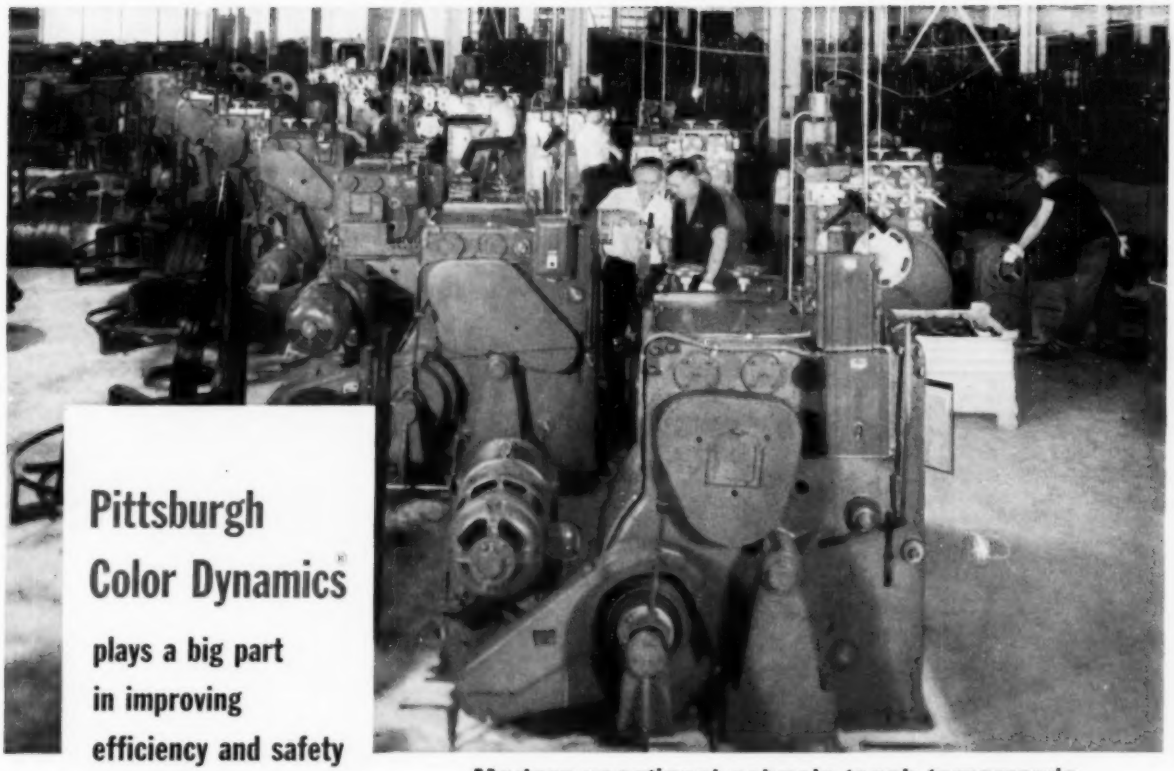

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Industrial Arts and Vocational Education
The Shop Teachers' Professional Magazine
NOVEMBER 1958

Provision For Handicapped Persons in an Industrial Democracy

HAROLD H. PUNKE
Alabama Polytechnic Institute
Auburn, Ala.

For several centuries there has been mild concern for handicapped persons, with humanitarian gestures regarding them. Jesus and other leaders have urged greater consideration for the halt, lame, blind, diseased, or "downtrodden" than that which prevailed in the society of the time. But progress toward long-advocated goals has usually been slow.

Many living Americans can recall individuals who have been ridiculed or physically abused because of some real or imagined defect — physical, mental, emotional; or even social in the case of illegitimates, "paupers," or "white trash." Derogatory attitudes are shown through nicknames, avoidance, insulting remarks, failure to provide for growth and development, or perhaps institutionalization under conditions accompanied by a high death rate. In older societies they were often, as children, *exposed* to die from starvation or cold.

Several primitive characteristics appear in the treatment described. It is easy to regard others as queer if they differ from oneself — in physical qualities, dress, ideas, language, or customs. But as people learn more about human beings, as well as about other aspects of the world, they broaden the base for interpreting human differences. Handicaps are therefore less likely now than formerly to be interpreted as *work of the devil* or *the nature of the critter* — with the implication that the thing to do is to avoid or eliminate the handicapped person, lest you become *like him*.

1. *Increased provision for handicapped persons.* During the past century there has been in America a marked increase in concern for handicapped persons. Part of the increase has resulted from greater social insight and greater clarity in stating democratic goals. But clarity in stating goals is relative to the development of a science which offers improved explanations of causes and more varied remedies. We know much more than in Lincoln's day about causes and remedies regarding visual defects, or regarding auditory and speech defects, birth injuries, aftereffects of some diseases, injury through accidents, mental handicaps, and biological sterility. We also know more about the origin and modification of delinquency, motivation for work or learning, or conceptions of success. With more knowledge it is possible to improve many types of handicaps which in former generations would have been considered hopeless. Since we *know how* to help, it is easy to accept the idea that we *ought* to do so. Hence it is now less adequate to assume the attitude "the poor and the handicapped you will always have with you," so why bother!

Increased vocational complexity, with broader range in available jobs and in capacities needed, has increased the opportunities available to handicapped persons. When most of the nation's gainfully employed population engaged in agriculture, a century ago, marked physical strength and endurance was essential. Persons with this quality were prized; those without it seldom accomplished much. Since mechanical power has been largely substituted for muscle power, physical strength and ability to endure physical hardships are less important. Many physical shortcomings are no longer vocational handicaps, and others are remedied sufficiently to reduce their limiting influence. Employees in various types of work have spectacles, hearing aids, plastic surgery, artificial limbs, or wheel chairs, and others have vocational possibilities affected by cardiac, respiratory, diabetic, nervous, or similar functional limitations. Medical technology has done much to define the nature and scope of such handicaps. Technology in other areas has provided many sedentary jobs, automobiles, and other means of transportation equipped especially for handicapped persons, ramps instead of stairs, and elevators which accommodate wheel chairs or similar equipment. Minor changes in operating machines often contribute substantially, as do provision for health and *first aid* services.

During the past few decades there has been a marked increase in employment of handicapped persons. Labor shortages during war emergencies have increased the demand for productive capacity, stimulated experimentation with training programs and artificial aids for handicapped persons, and developed popular understanding about their possible contributions. However possibilities in the direction noted have not been exhausted. Future developments may add more than has so far

been achieved. But it is significant that science and technology have furnished a tangible basis for a morality which makes it seem that the state *ought* to recognize and develop the latent potentialities of handicapped persons. Enlarged provision for rehabilitation service, in the federal budget, is significant in this connection.

2. *The handicapped versus others, in developmental possibilities.* Although America could do much more to increase the productivity and recognition of its handicapped people, comprehensive philosophy must be concerned about the relative status, contributions, and responsibilities of different social groups. It is balanced and integrated functioning of the total population that determines the level of national well-being. Hence question arises concerning the extent to which society should direct its developmental energies toward persons who are handicapped, and who in a sense begin their developmental growth and preparation at a point further back than the *normal* starting point, in contrast with devoting those energies in persons who at a particular age have normal or superior equipment for developing social usefulness and responsibility. In a world of intense scientific and technological competition, no society can show relative growth or stability which does not show major interest in those elements of the population which promise to do most to develop the well-being of the group as a whole — regardless of sentimentality, humanitarianism, or similar consideration for other groups.

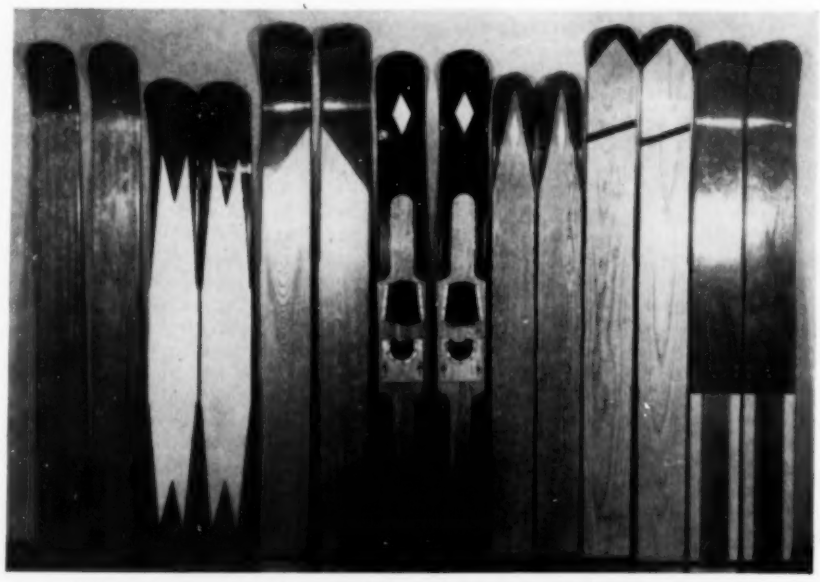
While strides have been made during recent decades in providing for handicapped children and adults, the educational, health, and physical development of thousands of *normal* and superior children have been neglected — through cramped and obsolete schools, inadequate nutrition or health care, and the absence of supervised recreation. Any society reflects a rough judgment of social values in the relative amounts of its productive energy that it devotes to health, education, recreation, clothing, highways, alcoholic beverages, churches, and the many other uses to which resources are put. The distribution among uses is determined mainly by the adult population, although some adults exert more influence than others. In America today most of the important resource-use categories are represented by organized lobbies.

Promoters within such groups often have selfish interests in extensive provisions for particular groups. Children do not organize lobbies. Hence in lobbies that exert pressure for them, selfish interest of promoters is not reflected by direct beneficiaries but by persons who hold jobs or supervise funds used in rendering service to the children. In such cases selfishness is *one notch removed* from the beneficiaries — in contrast with groups in which the lobbyists are themselves direct beneficiaries. With increase in number of *notches removed* there is an increase in the extent to which the activity is of public rather than private interest. Moreover, benefits which are intended to accrue directly to a large part of the population have to be regarded as public — the larger the number, the more nearly the entire public is included. Undertakings which promise only remote or uncertain personal benefits to promoters are also essentially public.

Education of the nation's children, as well as provision for their health, recreation, and other well-being, assumes great public importance. However because of variance from the average, it is easier to recognize some limited group — such as those with substantial handicaps, than to recognize the larger and less specifically defined group of average persons. Hence it may be easier to work up sentimental or other interest concerning a small group with tangible handicaps than to develop interest in the large nonhandicapped group — with the relative importance of probable contributions from the two groups largely lost from view. One outcome of the situation described is the growth of a multiplicity of little special-interest groups, with or without legislative status and public funds, to help this or that small group — while the well-being of the large nonhandicapped group suffers by default because our leadership lacks the insight to see the big issues and busies itself with the maze of little ones.

Most adults know of handicapped individuals who have made outstanding contributions, and may be greatly influenced by such knowledge. Franklin D. Roosevelt is often mentioned as a recent instance. With the development of aids for handicapped persons, and of vocational differentiations, such instances should become more numerous. But the point here concerns the relative use of resources — through what avenue the use of an extra ten million dollars will contribute most to the general welfare.

3. *Limitations of top leadership, and development of the competent.* In any expanding society, leaders can accomplish little without a competent following, and a competent general citizenry can do little without wide-awake leaders. Widespread public education, along with vocational opportunity and social freedom, has done much toward developing a technically and otherwise more competent average citizenry in the United States than exists in most countries. One should perhaps be more modest in comparing leaders in present-day America with leaders in other countries — although there is great variation among areas of leadership. It is sometimes maintained that a larger proportion of America's high-level competence has entered business and industrial fields, as compared with the fields of art or statesmanship, than is true of some



Water skis made in the wood shop classes at Cudahy High School, Cudahy, Wis. Louis Barocci, instructor

European countries. But if wars, depressions, colonialisms, or rotating systems of tyranny are used as bases of judgment, or if such developments as motion pictures and television are considered among the arts, it is easy to overrate the Europeans.

But the point here concerns the extent to which wars, depressions, and other social catastrophies or achievements are associated with strength in leadership or strength in followership. A considerable extent may depend on whether one maintains that leaders are *drafted* by an alert and dynamic citizenry, or that a dynamic leader sparks enthusiasm and focuses the aspirations of an otherwise lethargic or confused people. In a democratic society in which substantial effort is made to develop the competencies of each person, much responsibility should rest on the general population. But in matters of broad public concern, this responsibility is mainly one of evaluation — with acceptance or rejection, rather than one of initial creativeness to design the architecture of government and formulate specific measures to be submitted to the people. Under present-day conditions it is unrealistic to assume that the educational and other opportunities available to the general population, in this country or other relatively democratic countries, will develop leadership competencies in the general run of persons which are equal to those developed in top-flight members of more rigidly stratified societies. This point is of great importance when we continue to use secret diplomacy and secret meetings among top-flight political leaders of different countries, or make similar concessions to autocratic tradition in determining international policy — and when an interdependent world makes domestic policy largely an appendage to international policy. When democracies follow this autocratic tradition they deny themselves the use of their strongest resource — the support, at each step, of a relatively informed and intelligent electorate.

Since business and industrial enterprises in America are usually controlled by boards of directors, with a secondary role played in some instances by labor leaders, it follows that the procurement, manufacturing, distribution, or service activities of an enterprise will be governed primarily by the directors. Shortages, oversupply, and other miscalculations are therefore to be attributed primarily to leadership — not to the *rank and file*. Similarly, depressions and malfunctions in most other aspects of our social structure are to be attributed primarily to weakness of leadership.

It is easy to point to a failure or limited competence of leadership, as here implied, but difficult to devise a system for selecting and preparing comprehensive leaders — within a basic democratic framework. Yet difficult as the task may be, it is one to which effort must be directed.

a) Within the foreseeable future there will be controversy about the relative roles of social opportunity and innate potentialities in human competence. Although we are still far from Jefferson's ideal of equality before the law, enough progress in that direction has been made to make it clear that *equality of opportunity* has more ramifications than Jefferson realized. Aside from opportunity in such areas as education, recreation, health services, vocational employment, and fruitful social contacts, are such less tangible influences as desire to accomplish, willingness and ability to sacrifice intelligently, persistence of application, and responsibility in fulfillment of trust. Certainly homes vary greatly, and nobody has yet suggested a feasible way of making the parents in different families *equal* with respect to child-rearing interest or potentiality.

b) Related to the foregoing problem is a need for basic research on the nature of intelligence and the factors which influence its development. More information should reduce the energy wasted in *yapping* back and forth about nature and nurture, by rival vested-interest groups, and help place educational and custodial programs on an objective basis. Research of the type suggested is probably best carried on by teams of co-operating specialists — including geneticists, sociologists, biologists, psychologists, educators, pharmacologists, neurologists, and statisticians.

c) Another area in need of basic research involves the nature of *creative imagination*. What are the conditions leading up to the emergence of a *flash of insight* or *promising hunch* and what can be done to make such *flashes* occur more often among creative workers or among a larger percentage of the population? The related tasks of impressing a creative worker with the importance of grasping and working with an initially hazy or fleeting hunch to clarify it and reduce it to some comparably stable form may be easier than the research task noted — but no less important. If we know more about the nature of creativeness, then creative contributions to a developing culture would not have to depend so largely on chance as they do now. And we would know better how to develop leaders.

d) In America, leadership will probably for some time depend on both selection and special preparation. Where there is immediate need for a task to be performed, there is no opportunity to devise special preparation — it is necessary to rely on selection. More leadership foresight at an earlier time might either have avoided the neglect which let the need become immediate or have provided training for situations resembling that at hand. Comprehensive foresight regarding educational development will improve the population base from which selection may be made, but it will not eliminate the role of selection.

e) One crucial point, in developing the educational competence and moral integrity needed for socially constructive leadership, is that up to such time as selection for special leadership preparation is made there must be broad equality for developing the qualities on which selection is based. A second point involves recognizing that splintering our social resources and directing greater portions of them to various handicapped or similar special groups may not contribute much to the development needed. Some individual leaders will come from handicapped groups — more presumably in the future than in the past, but it does not seem realistic to look for many leaders to come from groups that early in life have substantial handicaps to overcome before they are ready to start development where others start. Yet there is great variation among handicaps, and much depends on the type and degree in a particular case? Greater leadership insight in the past might have avoided the appearance of many present-day handicaps — resulting from accidents, disease, malnutrition, educational and emotional neglect, or failure in early detection and treatment of minor difficulties. The agencies which control employment, educational, health, and other social services are of great importance in this connection.

With existing technical knowledge we could do better than we do now — if there was greater willingness to accept change based on such knowledge.

4. *Surplus productivity, and increasing the capacities of handicapped persons.* The level of productivity which a society has attained is important relative to concern about the productive potential of handicapped persons. Individuals with handicaps have for decades contributed to our productivity and to bringing the total up to its present level. Hence much productivity by this group is now part of our social structure. With respect to further increasing the productivity of the group, two opposing considerations are noted. If we are approaching adequate or surplus productivity in several areas of our economy, how much social effort should be devoted to a further increase in productive capacity — particularly among persons who have substantial obstacles to overcome in developing productivity? On the other hand if our current productive

capacity can supply the population adequately or provide a surplus, or if great waste typically occurs in our processes of production and consumption, do we need to be disturbed about the consumption of productive energies and resources that might be used in developing handicapped persons. Careful accounting seems to show that for many handicapped persons the economic cost of special training, equipment, and service related to preparation is more than offset by the value of subsequent production — plus reduction in custodial costs.

But how realistic is it to talk about surpluses in present-day America — agricultural surplus, when within our country there are several million undernourished children and adults; surplus in educational and training facilities, when there are millions of children crowded into obsolete and hazardous school buildings and taught by inadequate staffs; surplus in medical personnel and facilities, when there are millions of children and adults who are unable to secure the medical services they need; or surplus in scientifically and technically trained persons, when many research and developmental projects have to be postponed or omitted because it is not possible to locate personnel qualified to carry on the work. Perhaps instead of stimulating anxiety about surpluses, we need to develop more competence among leaders for revising our system of distribution, and more understanding among the people generally regarding an up-to-date concept of adequacy. The major point of foregoing discussion nevertheless remains — when our system of distribution is obsolete in many respects and allows surpluses to accumulate in some areas while there are marked deficiencies in others, in what proportions should handicapped and other groups share in the productive energies and resources which the system does make available?

Under democratic, communistic, monarchial, or other systems of social organization the extent to which the productive and creative potentialities of the people are developed, and the extent to which their needs and desires are met, depends greatly on the quality of leadership. Most of the world's bottlenecks and limitations seem historically to have been at the leadership level.

5. *Moral value for all, in consideration for the handicapped.* In a sense that is often overlooked, persons who are normal in physical, mental, emotional, or other capacities and developments have a stake in extensive provision being made for handicapped persons. Being able to hold a pay job and contribute to the general stream of socioeconomic activity greatly bolsters the self-respect and sense of belonging of the participants — whether handicapped, or otherwise. Each gain in potentiality that is made by the obviously handicapped, in productive capacity or other avenues of favorable recognition, increases the sense of security and stability of individuals who are "further up the line" — from the margin of acceptability. While depression or other general economic shifts may move this margin back and forth somewhat, it is the relative status of the handicapped and nonhandicapped that is important in the present connection. A sense of security within the group, whether embedded as a substrata in the mores or crystallized into social-security legislation, makes it possible to submerge somewhat the individual selfishness that is basic to self-preservation in a society of primitive individual competitions, and to reflect concern for the general well-being — through a wider brotherhood, humanitarianism, missionary spirit, or solicitude for fellow man.

In the sense described, greater concern for the handicapped and the less fortunate in this country further develops the home basis of democratic philosophy and practice on which international programs of brotherhood, good will, humanitarianism, and co-operation might rest. But it is important to keep in mind the interdependence of operating philosophy and material facilities. With the low level of material production that prevails in much of the orient, it would be very difficult for most societies there to provide as extensively for physically handicapped persons as is possible in the United States. Any philosophy in a technically backward country, which professed to maintain such a high level, would be mainly a *paper* statement. On the other hand industrialized Germany under the Nazis, some Iron-Curtain regions, and several other industrial areas afford examples of material competence to do more than the prevailing philosophy allows. How much material goods one must have before he is willing to share part of it with his neighbor is greatly influenced by philosophy.

Personal sacrifice by parents for their children is in a somewhat different category from individual philanthropy or group effort for rehabilitating handicapped persons. The genetically close association of parents and children has generated a feeling of responsibility by parents for their children which is much older in our culture than any sense of social or humanitarian responsibility of individuals for their neighbors — near or far. Some parents still look upon their children as sources of security in old age — although disappointment in this respect has increased with industrialization. Also many parents look upon their children and subsequent descendants as affording tangible participation in the hereafter — in life beyond the grave. In some respects social proximity beyond the immediate family group is important — in the sense that many persons will sacrifice for friends or members of the local community more readily than for some culturally or geographically remote group. This factor becomes important as communication, world politics, and other developments bring *remote* groups closer together.

6. *Handicapped persons, and the culture pattern.* From foregoing paragraphs it should be apparent that provisions for handicapped persons have many social ramifications — in countries like the United States. Progress in analyzing and evaluating the problems involved is essential to further development of a democratic social philosophy. A comprehensive outlook seems essential for persons who work professionally or otherwise with handicapped persons. In addition, further insight into the biological and social phenomena of life, along with alertness concerning a wider responsibility for prevention, should mean that future generations will enjoy a reduction in the percentage of persons with handicaps.

Grown so popular that it now is a custom, rugs are being taken up for the summer to be cleaned and stored. With the floor uncovered, it is an ideal time to renew the wood surface.

With a shellac finish, it is possible to retouch worn "traffic" spots without doing the whole floor. First remove any wax or oil film. Then sand or steel wool lightly and dust clean. A thin coat of fresh, white shellac should then be applied. After allowing two hours to dry, apply another shellac coat. In three hours this second coat will be sufficiently dry to walk on.

Because shellac dries so rapidly, a new finish can usually be given a floor in the course of an evening. The denatured alcohol used to dissolve shellac evaporates quickly, leaving a durable, satiny surface. If a third coat is desired, allow overnight drying before application.

A free booklet giving instructions on floor finishing will be sent to those who write the *Shellac Information Bureau, 51 Pine St., New York 5, N. Y.*

It costs $6,273 a year to maintain one American soldier, but the U. S. pays out only $539 to maintain one soldier of the NATO allies. — *Wisconsin Military District Information Office.*

Student Survival Factors in Stout State College

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The study herein presented attempts to locate those factors found in the better male industrial-arts college students and, if possible, to make recommendations concerning selection procedures.

Institutional Tests

The following entrance tests were given to each Stout State College freshman male during his orientation week:

The American Council on Education Psychological Examination for College Freshman was the general scholastic aptitude test taken by each freshman male student.

The American Council on Education Cooperative English Test, Test C 2; Reading Comprehension (Higher Level) Form T², was the second entrance examination taken by each entering male student.

The Myers-Ruch High School Progress Test, Form A∞, for Senior High Schools, was the third entrance test given all freshmen. This test includes four divisions covering the following fields: English, social studies, mathematics, and science. The test was used principally to evaluate high school background in the above areas among entering students.

Collection and Tabulation of Data

The first step in the collection of data for this study was the determination of those persons to be included. Students who had had college work of any kind prior to the taking of three entrance examinations were excluded from the study. It seemed that inclusion of such students might affect some of the test results obtained. In particular it was thought that more valid measures could be obtained on the English and Myers-Ruch progress tests if all students having already had college level courses were eliminated from this study. This restricted the study to students who officially enrolled as regular students at Stout State College without having had college-level work prior to taking the entrance examinations.

Because of the planned scope of this study and, after a careful study of available records, it became apparent that the classes entering the fall terms would provide the data necessary for use in an attempt to develop suitable selection procedures. Names of students were then obtained from the entrance test records for the above classes. These names were compiled into a beginning master list. A revised master list finally included a total of 393 students. Test scores on the American Council on Education Psychological Examination, the Cooperative English Test, the Myers-Ruch High School Progress tests were then recorded for each of the 393 students. As these test results were in raw score form, all were changed to percentiles.

Rank in high school graduating class was obtained for each of the 393 students. This rank was, in all cases, expressed as "first in a class of eight" or "fifteenth in a class of ninety" as the

	PREDICTED																	
EARNED	0– .1	.1– .2	.3– .4	.5– .6	.7– .8	.9–1.0	1.1–1.2	1.3–1.4	1.5–1.6	1.7–1.8	1.9–2.0	2.1–2.2	2.3–2.4	2.5–2.6	2.7–2.8	2.9–3.0		Totals
2.9–3.0																		
2.7–2.8											1							1
2.5–2.6																		
2.3–2.4														1				1
2.1–2.2									1	1								2
1.9–2.0							1			1								2
1.7–1.8							1	1		4	2							8
1.5–1.6								2	3									5
1.3–1.4							1		2	1								4
1.1–1.2					1	2	3	3	1									10
.9–1.0					1		4	1										6
.7– .8						2	2											4
.5– .6					2	1	1	2										6
.3– .4				1	1		1											3
.1– .2																		0
0– .1					2	2												4
Totals				1	7	7	14	9	7	7	3	0	0	1				56

Fig. 1. Relationship between earned and predicted total scholarship

case might be for each of the entering students. It was, of course, necessary to change this ranking to percentile scores.

The four preceding measures in percentile form were then changed to T-scores, because percentiles do not represent equal units over the entire scale from 0 to 100. This was accomplished by using Table *IX*, in "Probits, Transformation of the Sigmoid Dosage Mortality Curve to a Straight Line,"[1] and by shifting the decimal point one place to the right.

The number of high school industrial-arts and mathematics units which each student had earned was secured from his high school record.

College grades were collected for each student, and the necessary honor-point ratios computed. After these college grades had been classified as technical or academic, averages were computed for each of these two classifications as well as for a total honor-point ratio. In computing these averages and honor-point ratios it was necessary to change all letter grades to a numerical system so that calculations could be made. The five letter grades were given the following weights: $A = 3$, $B = 2$, $C = 1$, $D = 0$, and $F = 0$. These weights are the ones used in computing grade-point averages at Stout State College, and it was felt that the results of the study would be more directly usable if the same weights were used here.

These honor-point ratios were then posted on master pickup sheets, one for each student. Each such master sheet was coded and for each of these sheets an IBM card was punched.

Information used to compute all zero order correlations was obtained by the use of these IBM cards. This information, which was comprised of sums of squares and the sums of products, is included among the Appendices of the study.

Zero order correlations and regression equations were then computed for the technical area subjects, for the academic area subjects, and for total scholarship.

Prediction of First-Semester Honor-Point Ratios

With the information obtained from the foregoing the following regression equation for the prediction of first-semester honor-point ratios was developed:

$$Y = .0116695X_1 + .0216715X_3 + .0207279X_4 + 1.319$$

Where:

Y is the predicted total honor-point ratio
X_1 is the ACE Psychological test score
X_3 is the Myers-Ruch test score
X_4 is the high school rank

With the above equation honor-point ratios were predicted for the freshman class of 1951. The results of that prediction are included in Figure I. It is interesting to observe that failure was predicted for fifteen students and, of this total, twelve earned less than a "C" average with the remaining three earning an honor-point ratio of only slightly above a "C" average. Success was forecast for forty-one, and thirty earned better than a "C" average with eleven failing to do so.

Summary

Utilizing the data described earlier evidence was presented to justify the following observations.

1. A high school background of industrial arts is not essential for scholastic success and graduation from the college.
2. The relationship between first-semester technical honor-point ratio and number of industrial-arts units offered at college entrance is zero.
3. The American Council on Education Psychological Examination for College Freshman, 1947 edition, assists little in identifying the entering student who will later graduate.
4. The American Council on Education Cooperative English Test C_2: Reading Comprehension (Higher Level), Form T, does not assist in identifying the entering student who will later graduate.
5. It is possible that there may be a desirable critical score for the Myers-Ruch High School Progress Test, Form A_m, that would serve to identify the entering student who will graduate four years later.
6. The high school rank possessed by those students who graduate is significantly different from that possessed by those students who do not graduate.
7. The high school rank for those who survive two years of college work is significantly different from that possessed by those students who drop out before the end of the sophomore year.
8. The prediction of scholastic success or failure based upon the measures included in this study appears to be impractical in the technical area.
9. The prediction of scholastic success or failure in the academic area and for total scholarship, based upon the measures included in this study, seems to merit some consideration.

[1]Ronald A. Fisher and Frank Yates, *Statistical Table for Biological, Agricultural, and Medical Research*, pp. 50–52 (London: Oliver and Boyd, 1949).

Education in a Scientific Age

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Director, Vocational Education
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During the past two or three decades, technological developments in industry have compelled all interested individuals to examine the public schools from the elementary level through the post-high school area. There have been innumerable studies carried out with respect to the relationship of education to an industrial and technological society. Such studies and observations have made us aware of the necessity of adjusting our educational system to the scientific age in which we are living. We have become increasingly conscious that we are in the midst of the Second Industrial Revolution or a Robot Revolution. Others, more conservative perhaps, regard the new trends in industry as an evolution rather than a revolution.

Mass production, industrial chemistry, electronics, atomic or nuclear energy, and many other fascinating developments, are challenging us to look toward better training programs. The robot vocabulary — automation, feedback, self-regulating control, servomechanism, etc. — causes us to look with excitement to the future.

Our attention has been also focused on the shortage of skilled man power. This shortage has existed for some decades. Secretary of Labor, James P. Mitchell, said recently that this nation will need about 10 million additional skilled workers by 1965. It is estimated that half of this labor force will be women. So we should be greatly concerned with the training of women as skilled workers and technicians. In the

midst of this situation, what should be the particular concern of vocational education, in our case, trade and industrial education?

Undoubtedly much attention will have to be devoted to the problem of preparing and utilizing individuals with optimum effectiveness in industry. This need pushes into the forefront the question of how to prepare skilled workers and technicians capable of supporting the advanced activities of engineering and science. Now, more than ever, there is compelling evidence that technicians are growing in importance and that their preparation will have to be carried on in post-secondary vocational and technical schools. In the introduction of the bulletin *Your Opportunities in Industry as a Technician*, published by the National Association of Manufacturers, we read: "There just aren't enough technically trained young people on hand — people who like mathematics and applied science and enjoy new work and hard work — people who are able to help turn the theories and ideas, the drawings and doodles of scientists and engineers into wonderful, workable products and processes. That is the assignment of the technician."

The many technological changes and innovations that we are experiencing today require an increased number of personnel to meet the needs of the industrial society in which we live. New innovations in industrial plants and new testing procedures in laboratories create a demand for training that will permit specialists and technicians to perform on a higher level of professional competence than ever before. Our trade and industrial education program will be strengthened by playing its role in this respect through the training of technicians for the present scientific age.

Vocational-technical training should be promoted and developed as our main effort to serve the scientific developments under way. A sound training program for the preparation of technicians might be developed in relationship with engineering education. The team: the engineer, several technicians, and a group of skilled workmen. The technician is the right hand of the engineer. Vocational-technical programs can be organized for the training of engineering aides such as different types of draftsmen; scientific aides, such as laboratory assistants; material testers in industrial plants; power plant operators; technical specialists, such as certain types of inspectors; technical production supervisors and maintenance supervisors.

Another goal of the trade and industrial education program should be the increase of the working force on the technical level. Training programs for the upgrading of the workers would be a means to prepare technicians. Management training programs are needed. Plans for the finding of capable people to enter higher levels must be developed. Extension training programs for the promotion of workers should be offered.

We should estimate and meet the needs of government agencies and industry for the organization and development of training programs on the technical level. Training programs should be offered to develop specific skills in the use of tools and apparatus for a particular science or art. Programs for the retraining of workers according to technological changes can be offered. In this respect let us think about automation. Many experts in this field believe that automation will not cause unemployment; instead it will bring training and retraining of workers, specialists, and managers. The most important impact of automation will not be on employment itself, but on the qualifications and functions of employees. Engineering and technical associations should work together with educational institutions to determine needs and develop programs. The training programs to be developed will be mostly technical and they must be closely geared to scientific practices used in industrial production and maintenance. The data from industrial surveys and from surveys of the present educational facilities, will help to determine what types of programs are needed and feasible and the patterns of organization and administration required to establish and conduct the vocational-technical education programs for the present and the future.

Vocational-technical training stresses definite industrial application of the laws of science and technical knowledge and necessary skills involved, and as such, I would say it is a must in our program for the development of the new type of personnel needed in industry and government.

Technological and industrial development points to the need for programs of education beyond the high school level. Advances in electronics, chemistry, aviation, and many other industries essential to the well-being of this country, are aggravating the shortage of scientists, engineers, and all kinds of technicians. Automation in an electronic and nuclear age is already having fundamental effects on the immediate and future employment of our labor force.

In the electrical and chemical industries, where demand for trained man power is acute, use of technicians has become widespread; in the construction industry, their employment has been limited, but this picture is changing.

The place of the trade and industrial education program in the training of technicians to meet the man-power needs of the nation, is of greater importance today than ever before. This is a real challenge to all of us.

In Puerto Rico, during the past year numerous discussions have been held by various noneducational agencies, the Department of Education, the University of Puerto Rico, and other private institutions of higher learning, with regard to the relationship of special education to an evolving industrial society. In the spring of 1957, Dr. Otto Klitgord, president of the New York City Community College, made a comprehensive study of the industrial problem. In his report he pointed out the necessity of exploring potential contributions of post secondary vocational and technical education to the economy of the Commonwealth.

During the summer and fall of 1957, conferences concerning various approaches to the problem were carried out at the office of the Puerto Rico Economic Development Administration. As a result of these meetings, the Economic Development Administration secured the services of Dr. Lawrence L. Jarvie, executive dean, State University of New York, and Dr. Otto Klitgord, who had made a previous study. The mission given to these consultants was primarily to advise on the next steps that might be taken in evolving a program of post-secondary technical education compatible with the present and future development of the industrial economy of Puerto Rico.

The bases for the recommendations were:

1. What types and levels of vocational and technical education are essential to the maintenance and development of the industrial structure being served?
2. What evidence is there of the *current need* for the product of post-secondary technical education?
3. What evidence is there for a *long term need* for the product of post-secondary technical education?
4. Are there facilities available for housing and supporting the program?
5. Will competent personnel be available to staff programs as they develop?
6. What should the relationship of new programs be to the existing educational structure?

The report and recommendations of these two outstanding educators in the field of vocational-technical training will be carefully studied and analyzed in future meetings by a central committee created for this purpose. Thus we are taking the first steps to do our part in developing a vocational-technical program in conjunction with the scientific and technical advances of our era.

Industrial Arts and Vocational Education

JOHN J. METZ, Editor

A MONTHLY OUT-OF-SCHOOL ACTIVITY LIST FOR THE HOME

DID you ever try to get your students interested in setting up a list of yearly recurrent jobs that homeowners could use so that these jobs would be started on time and not when attending to them will be more or less troublesome?

Almost every boy is interested in one or more sports. That same boy may also have certain specific duties to perform at specified times. Probably a class of boys can be interested to set up a list of such jobs which they have been called upon to perform at one time or another. Such jobs when they arise at inopportune moments can cause real emotional upsets among your students.

Naturally, there is seldom a boy who wants to be reminded to insulate the water system on an autumn Saturday afternoon when his high school team is playing an important football game. He would tackle such a job without doing too much complaining if it had not come up just on a Saturday when he deemed it necessary to be at this particular game.

Would it help to have a list of jobs that come up during the winter, spring, summer, and autumn so that the class can discuss them briefly and plan just how the work can be accomplished without interfering too much with the boy's personal plans.

The teacher may well think back to his own youth and imagine how he felt when he had planned a definite program for a given week end and then found that he had to change it for something he didn't like to do too much anyway.

While the suggested activity list is being prepared by and for the students, the teacher should work out a similar list for his own duties at the school. If each teacher had such a list, there would be less forgetting doing important duties that are of infrequent occurrence.

Incidentally, INDUSTRIAL ARTS AND VOCATIONAL EDUCATION would be glad to get such lists after some reader or a reader and his students has developed one or more.

BACTERIA THAT HELPS TO MAKE IRON ORE

MANY laymen will think that the title used for this editorial is not based on truth. However, it appeared some years ago in "Steel Facts," which is published by the American Iron and Steel Institute. The publishers of this little paper state that the material used by them is based on information that is believed to be authoritative, hence, we may safely assume that this article is correct and that some types of iron and steel may be directly associated with a form of actual life — iron depositing organisms which help to make some forms of iron ore.

The best-known of the so-called iron bacteria and other organisms is the bacterium *Leptothrix ochracea*, which appears to be capable of self-nourishment on inorganic compounds. These microscopic "bugs" were busy in prehistoric times helping to form rich deposits of "bog" iron ore, or limonite, to be used by man millions of years later. They are still found today, although relatively scarce. Their importance to the iron and steel industry has greatly diminished, due to the fact that the nation's great ore deposits now in use were formed by other processes.

The leptothrix bacterium does not create iron, but "processes" it. Living in iron-containing water, it absorbs the iron from the water and deposits it as insoluble ferric hydroxide. This oxide forms an iridescent scum of ocher on the surface, familiar to everyone in wayside ditches. The oxide then sinks to the bottom, to form bog iron ore.

The use of simple ocher, like the bacterium itself, goes far back into prehistoric times, the earliest use being for decoration of the human body and other objects. When deposited in quantity as bog ore, it has been, and still is to a small extent, used as a raw material in iron smelting. Such ore was used, for example, in the ironworks at Saugus, Mass.

It will be seen from the foregoing that bog iron ores are really so-called secondary ores, or produced from already existing iron, and that in their formation weather, water, and decaying vegetable matter assist the little bug in his work.

In addition to these bacteria, there are numerous other iron-depositing organisms, belonging to the flagellates (which are forms swimming with a fluttering or shiplike motion) and to the algae. These occur in a great variety of shapes. There is a loose analogy here to the familiar coral, in that the inorganic deposits or incrustations of these delicate organisms are far more noticeable and durable than the organisms themselves.

This item may not be an important detail in your list of related materials. It surely will arouse considerable interest among your students who, no doubt, have never heard of animal life entering into the production of a material like iron ore.

DEAR SHOP TEACHER

THE school year 1958–59 has now been under way for but a short time, but it is long enough for some earnest teachers to have already discovered that they want to make changes of some kind to make their work more efficient.

Every shop teacher should appoint himself a committee of one to make a careful study of how he can make his work for this year more purposeful.

Have you studied your new students to see which of them need special help of any kind? For some it may mean an eye test and probably glasses. For others it may mean medical assistance of some kind, and there will be some who will have to be given special help in one or the other of their shop studies or shop activities.

One of the most common physical defects to be found among the students may be defective teeth or eye troubles. Both of these, if caught in time, may help some students to avoid a great deal of pain or loss of school time.

Then there may be other than health troubles that should be corrected at this time. Probably a change in the lighting of your room has to be made for achieving better results with your class.

And then — how are your tool and project storage facilities? Can you do something to improve these two very necessary items of shop equipment?

Another item that may need your scrutiny is your material storage facilities. Do your students spend too much time getting out the materials needed to make their projects? Check into this — your students have no time to waste.

As you look around you may find out that other things need attention, early as it is in the school year. Your attention to them now will help you as they aid your students.

Vocational Education Program in Nebraska

ALVIN J. REMMENGA
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When Russia's Sputnik I began to circle the earth, it carried a somewhat delayed impact for the agrarian areas of Nebraska.

The initial shock of the scientific milestone was minor compared to the reaction which followed President Eisenhower's later appeal for improved educational standards, particularly in the fields of science.

While the satellite launching appeared somewhat distant from the essentially rural Nebraska population, the education appeal was something that knocked on their front door.

Not only was this message presented by the President but it became the topic of discussion at the next meeting of many a local school board.

It wasn't long before numerous Parent-Teacher Association organizations and boards of education had set up special meetings to examine the curriculum of their schools and make recommendations for improvement. Some of these intensified programs have already gone into effect in Nebraska.

Generally, the public has felt these changes were long overdue but some persons are beginning to worry about what one educator called the "overemphasis on science and mathematics."

"It's not that the nation doesn't need more scientists and mathematicians," he explained, "but this educational enthusiasm is pushing the scientific fields far out in front of other occupations that are closer to home."

In Nebraska, one of those occupations is agriculture.

The trend away from agriculture isn't something that started with man's adventures into space, however. It's something that got under way shortly after World War II and has been gaining speed because high school youngsters visualize higher salaries, opportunity for travel, and more prestige outside the business of farming.

To Harold F. Duis, director of vocational agricultural education for the Nebraska Department of Education, the tendency for farm boys to be encouraged away from the field of agriculture is "concerning." He believes sole emphasis on science and mathematics education may strengthen this trend.

His studies show that since the postwar enrollment of 5498, participation in vocational agriculture programs in Nebraska has declined in a ratio corresponding to the amount of emphasis placed on engineering and sciences at the 141 state high schools offering such courses.

The 1956 Nebraska vocational agriculture enrollment was down to 5378, the 1957 enrollment was 5120, and this year the number of students specializing in agriculture is only 4767. On the other hand, high school enrollments during the same periods have shown sizable increases.

This crop of agriculture-trained students is far from filling Nebraska's needs, Duis says.

A formula based on death and retirement rates shows Nebraska needs 3275 new farmers each year. But Duis says the state's high schools are turning out only 800 to 900 such students annually.

He lists three major reasons for declining interest in vocational agriculture:

Gerald Royal (left) of Palmyra and Instructor Bill Witmer inspect a sow Royal is raising as a vocational agriculture project. At right: Vocational agriculture youth at Palmyra, Neb., begin construction of farm trailer in their school's workshop

1. Emphasis on engineering and science programs in the schools.

2. The recent Midwestern drought which made parents say, "Farming is the last thing on earth I want my boy to do."

3. Economists who have been playing down the need for farmers and pushing the trend for larger farms.

The same trend that has appeared at the high school level is also extending into college educational systems, according to Franklin E. Eldridge, associate director of resident instruction and professor of dairy husbandry at the University of Nebraska College of Agriculture.

Students enrolled in strictly agriculture courses, he says, have decreased from 682 in 1955 to 647 this year, and less than the national rate of 16.8 per cent of these are returning to the farm.

Duis says two other factors which have become apparent are also disturbing to vocational agriculture instructors. One is that fact that many youths are neglecting science connected with agriculture in answering the call for more scientists and the other is that surveys have shown, in some areas, more than half of the youths studying agriculture have come from urban areas.

"Something is wrong when city boys have to study farming, and farm boys go to the city," Duis says.

In smaller Nebraska high schools where the educational curriculum is limited, vocational agriculture courses are still high in the interest of most youths. J. Howard Frazee, superintendent of schools at Sterling, says a recently instituted vocational agriculture program "is one of the most popular courses in the school."

But another school superintendent says this means "they're looking at the merchandise, but not buying." In other words, many of the agriculture-trained students aren't putting their knowledge to work on the farm or other branches of the field of agriculture.

One 18-year-old high school graduate, who completed a vocational agriculture course and actually had the opportunity to go into partnership on his father's farm, said he turned the offer down because "there isn't much opportunity on the farm."

Today, he is a ticket salesman for a New Mexico airline and while he admits the pay is low and he still has not found any long-range security, "I get around and I meet people."

These trends indicate to the Nebraska agriculture leaders that they have a big selling job to do among high school youths if agriculture is not to be permanently outdistanced by other scientific pursuits.

One of the most apparent answers, they believe, is to interest young students in the scientific aspects of agriculture.

"We are quite convinced that many Nebraskans do not recognize the tremendous number of opportunities in science that are closely related to agricultural fields," Dr. Eldridge says.

"A farm youth with a leaning toward science may make as valuable a contribution to the field of agriculture and find as good a job as the missile-building scientist," another agriculture official adds.

F.F.A. Boys. From left: Fary Matson, Ron Bevons, and Jack Nagel (test soil at N. E. High School)

Colors and the General Shop

JOHN B. HAGGERTY
General Shop Instructor
Lincoln School
Melrose, Mass.

Some years ago we made a small beginning in the matter of putting colors to work for us as aids in organizing general shop equipment and pupil personnel. A brief recap of our experiment to promote safety, and efficiency of pupil-shop workers is enlightening. It shows the need for further study in color research with corresponding application of results in industrial arts work.

Our first attempt at using colors employed red and green to denote respectively danger and safety elements within the shop area. Fire, First Aid kits, power-switch boxes, obstructions, etc., were colored as well as safe traffic lanes, assembly and egress zones.

We next introduced the color of yellow as an intermediate, precautionary color. This identification was used on all edged tools which were requisitioned at the central tool crib. Yellow was also used on all adjustable controls on power equipment. These included lathe tool rests, adjustment knobs, dials and vise handles. The pupils approved the use of this identification scheme. They said, "It helps us find things quickly and helps us understand the machines better."

Bench Tool List School..... Year 19...

BENCH NO.	Color	Apron	Awl	Brush	Compass	File	Gauge	Hammer	Knife	Mallet	Plane	Pliers	Protractor	Push Drill	Rule	Saw	Screwdriver	Snips	Square	Wrench	Coping Saw	Hack Saw	Surface Vise	Wood Chisel	Lock No.	Serial No.
1.	Dawn																								B4	0275
2.	Dogwood																								B4	0502
3.	Summer Mist																								B4	0498
4.	Cream																								B	36573
5.	Sun Tan																								B4	0408
6.	Hyacinth																								B4	0882
7.	Empire Yellow																								B3	6573
8.	Blue Clay																								B3	6574
9.	Antique White																								B4	0269
10.	Pottery Blue																								B4	0279
11.	Blue Spruce																								B	36571
12.	Meadow Green																								B3	6575
13.	Aqua																								B4	0499
14.	Pale Lemon																								B4	0500
15.	Turquoise																								B4	0516
16.	Colonial Gray																								B3	6570
17.	Old Ivory																								B4	0415
18.	Green Gage																								B4	0424
19.	Wine																								B4	0412
20.	Dove Gray																								B4	0280
21.	Maroon																								B4	0281
22.	Black																								B4	1411
23.	Partridge Brown																								B4	0405
24.	Dogwood																								B4	0504
	INVENTORY																									

Form used for inventory purposes

In the fall of 1946 we began to further experiment with colors as aids in tool identification. We began to use blue-green, brown, black, and white for separate area tool panels. Misplaced tools stood out against the background of another color. Pupils were quick to note the exaggerated disorder thus produced and proper replacement of the tools followed.

During 1950 we began to develop individual tool kits at each work station. The idea was to promote greater pupil responsibility for, and pride in his own kit of tools. Much of the congestion at the central tool crib and at the work-area panels was relieved by this organization. We called upon colors to aid our plan. Each pupil work station was painted an individual color. We used shades and hues of each color to paint each bench. All tools within the bench area were also painted the same color.

The shop superintendent makes a spot inventory of all bench tools each session. In our shop the workbenches are grouped in fours and there is a rotating pupil foreman responsible for his own group each quarter of the year. The above form is used for inventory purposes. Tools borrowed without permission stand out like sore thumbs against the wrong-colored bench. Pupils like the brightly colored tools and are quick to report lost, broken, or missing ones.

We are at present engaged in a cooperative program with the research staff of a large paint company. We propose to further find out just how colors help industrial-arts instruction and just how the general shop program can help to teach color appreciation through the use of colors in organizational units as well as project work and illustrative related studies.

We have found that colors exert a very effective emotional force which can aid the learning process. The general shop with all its colorful materials is an excellent place to teach pupils to use colors to decorate their work. They can also learn how to use colors to promote organization of tools, materials, and details of shop management.

PROJECT EXHIBITS?

DR. JOSEPH DUFFY
Associate Professor
State Teachers College
Montclair, N. J.

Much has been written, and still more said, about industrial-arts education and its correlation with general education — its aims and objectives — and the methods employed by its professional people to attain the ultimate goal. At a recent meeting of the Alpha Rho Chapter, Epsilon Pi Tau, forty members devoted the evening to a lively discussion of the pros and cons of national, state, and local project exhibits. This discussion did not involve the commercial exhibits as we know them at the national convention or state conventions, but was restricted to student project exhibitions. I was so impressed and enlightened by the evening's discussion that I write this with the hopes of challenging and provoking thought on this subject. The outcome of the evening was truly revealing; it showed only a few points on the *credit* side and no less than 14 points on the *debit* side.

On the credit side: (1) Industrial arts as it is known today by the majority of people (both school and laymen) does receive national, state, and local *advertising* or *recognition* via project fairs. (2) Project exhibits do acknowledge good work. (3) These exhibits are the only thing so far that does anything to promote industrial arts in large and small cities and towns. (4) They often bring into the sponsoring groups financial aid through participating commercial exhibitors.

These were the *credits*. Questions

were raised: "Is it worth the time and effort?" Does it accomplish the purpose?" And perhaps the most provocative question of all, "What is the purpose and is there a better way to accomplish that purpose than through project exhibits?" I will classify these points and, for clarity and consistency, label them the *debit* side of the ledger. Perhaps this ledger is guided by a philosophy of industrial arts and its relation to general education, but, if so, who is to say it is not a worthwhile, if not the ideal, philosophy with which to teach?

DEBITS:

1. Do these exhibits reach the people that we need to interest? Why don't we exhibit during conventions and the like? Is it strictly for members of our own field of service?

2. Project exhibits, on more than a one local school affair level, very rarely have more than a few participants compared to the total eligible population.

3. National-project exhibits and state-level exhibits are highly competitive tending to destroy rather than contribute to certain important aspects of a child's development.

4. Often encouraged by ego or a dozen other personal urges, a teacher could tend to neglect the child who needs him the most while he devotes his (the teacher's) time to the creation of a masterpiece that would be outstanding.

5. One might very legitimately wonder what proportion of the teacher's skill went into a *winning* project.

6. And how many of these fine projects were completed in class alloted time? Is it an exhibit of a hobby which can be time consuming, or a project completed under restricted class-time limitations?

7. Industrial arts should be much more than a completed project, but do project exhibits show the subject to be anything other than manual training?

8. Many teachers feel industrial arts is 40 to 50 per cent related material. Where is the correlation or integration of industry or *academic* education evidenced in some projects we see exhibited?

9. All students should receive recognition for a job well done. If a student works to his capacity, but because his capacity may not be proportionately as great as others, his work will naturally not be as pleasing to the eye as the better student's project. Should, or could, there be some type of recognition for that boy too?

10. Industrial arts is exploratory. The project is only an instrument employed to teach motor skills, appreciation and understanding of our industrial society, etc. These things are never portrayed or exhibited and are felt by many to be vastly more important than the project itself.

11. If industrial arts is exploratory, how can we honestly justify those huge, complicated, and technical projects (all done in class-time limitations too, remember!)?

12. How does the student feel whose project was rejected? There are many, too — does the recognition of a few mean so much when so many can be hurt?

13. Does the student who wins recognition really need such attention? Or is it the boy who struggles to achieve his optimum who needs that pat on the back?

14. Many local project fairs and exhibits are sponsored today through the financial contributions of our commercial friends. Can we always say they are present because they want to be? Were we entirely *professional* in our invitation to them to be present?

In summary, the principles for which the project fair was first established are worthwhile and merit our adherence. I do not believe that these principles can be constructively advanced by the present type of project fairs. Further, if these founding aims, goals, desires, ideals — call them what you will — are to be realized, industrial arts will have to cease proving its worth solely to and within itself.

Problems and Projects

HI-FI SPEAKER CABINET

PAUL T. JACKSON
Toledo, Ohio

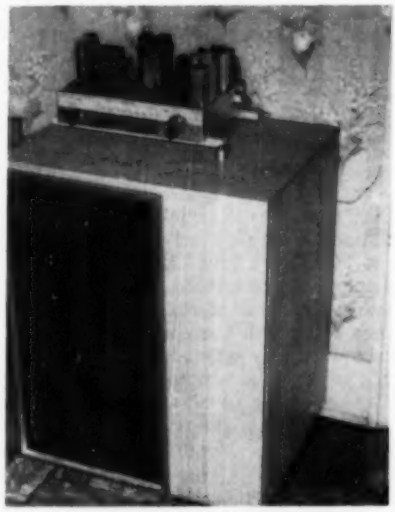
If you have an old radio that doesn't work and has a 12-in. speaker, don't throw it away. The speaker and the tuner (radio) can be fixed at minimum cost. Your record player can be hooked up to your old radio and recorded music can now be played through a larger speaker in a cabinet that gives equal support to low and high frequencies.

If you don't have an old radio and are putting together component parts for a hi-fi, this cabinet will make an excellent housing for any 12-in. speaker.

BILL OF MATERIAL

From one 4 by 8-ft. sheet of good one-side ¾-in. plywood cut:

1	Top	19½ by 25½ in.
1	Front	25½ by 30 in.
1	Back	24 by 29¼ in.
2	Sides	18¾ by 30 in.
1	Bottom	24 by 18¾ in.



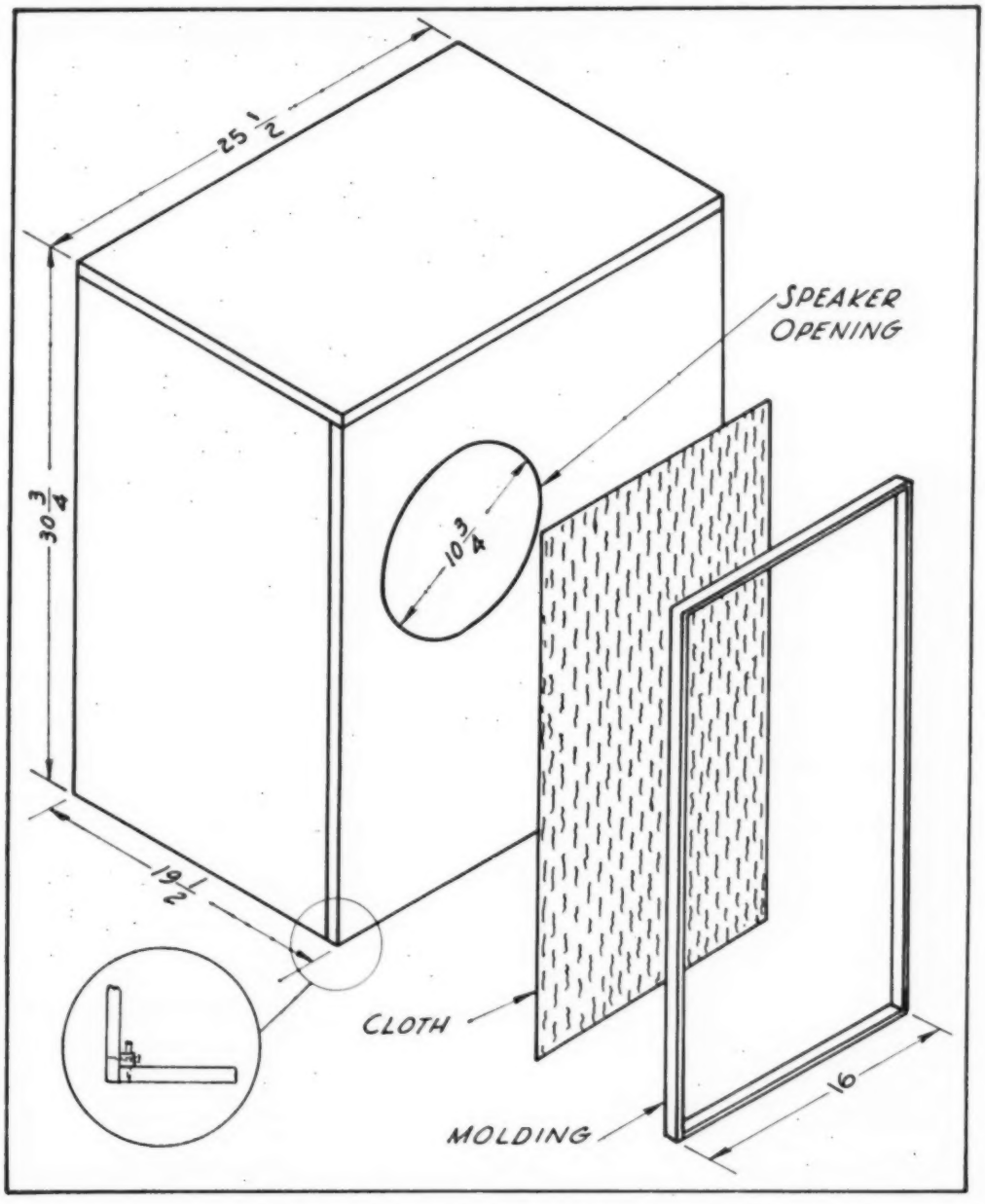
Hi-Fi speaker cabinet

Ribs for holding pieces together:
8: 1 by 1 by 15 in. soft pine strips
4: 1 by 1 by 24 in. soft pine strips

Kontact Paper: 6 yds. gray grained color
Grill cloth (comes in square yards): ½ yd. black and gold
Molding: 7 ft. 8 in. painted gold
Casters: (3) 1½ in.
Wood screws: 1 doz. ⅝ in., to fit casters
Wood screws: 6 doz. $\frac{3}{16}$ by 1⅝ in.
Wire nails: 1½ in., for molding
Carpet tacks: flathead for holding grill cloth
Wood glue
Gold paint: small jar
Flat black paint: small can
Wood filler
Foam rubber strips: to be placed between speaker and wood.

The tools that will be needed are as follows: an electric bench saw, an electric jig saw, a drill press or hand drill and a $\frac{3}{16}$-in. drill, a ratchet, screw driver, hammer, yardstick, pencils, drawing compass, scissors, paint brushes (two 1-in., and one ½-in.), brush cleaner, padding (on which to lay out pieces on floor), and clean rags.

The first step in building this cabinet is to prepare all the pieces of wood that will be used. The large pieces (top, front, etc.) can be cut out of one 4 by 8-ft. piece of ¾-in. good one-side plywood. The ribs



Detail drawing of the Hi-Fi speaker cabinet

which will be used to screw the boards together can be cut out of soft pine scrap wood. The molding also can be made out of scrap wood. I used the rounded edges of a 2 by 4 and experimented with the bench saw at an angle until I got the molding I desired. As soon as the molding is ready, paint it with gold paint, or use other desired color.

Now that the pieces are all cut, the next thing is to prepare the bottom, front, top, and two sides respectively, so they will fit together. The best way to do this is to fit the pieces together. Remember to put the best side of the boards toward the outside. The ribs (1 by 1 sticks) will go inside and in the angles formed by the perpendicular sides. The front and back will have no ribs. The ribs should have three $\frac{3}{16}$-in. holes drilled clear through and spaced evenly, and then the same should be done to the adjacent sides. There is the exception, however, that the ribs which will finally hold the back in place need only three holes in one direction, rather than holes going in both directions. The ribs and screws are the means of pulling together and holding the boards tightly in place.

The bottom, then, will take four 15-in. ribs. All the ribs on the bottom will be flush with the edges (except the one at the back, which will be placed $\frac{3}{4}$ in. from the edge), and centered between the corners of the board. When the places for the ribs have been found (do this by fitting all the pieces together first), glue them to the bottom and screw them down tightly with the $1\frac{5}{8}$-in. wood screws. Now turn the bottom over and find the places for the three casters, or other legs. I put two in front and one in the rear. The front casters were placed 3 inches in from both front

and sides. The back caster was placed 3 inches in from the back and centered between the sides. The bottom is now complete with four ribs held in place by glue and screws, and three casters on the opposite side, also held in place by wood screws. The bottom should be painted with flat black paint and put aside to dry. The color scheme suggested here may be altered and other finishing methods also may be used.

The front is the next piece to get ready. First mark off the 16-in. panel where the grill cloth will go. Then draw a line down the center of the 16-in. panel, from top to bottom. Draw a 10¾-in. circle with the circumference line three inches from the edge that will be at the top. After the circle is drawn, drill a hole inside the circle and jig saw it out. The 16-in. panel is then ready to be painted black, or whatever color the grill cloth will be, so that the opening will not show when the grill cloth is in place. The front is ready to be placed aside for drying. I would not recommend cutting other openings with the intention of using high frequency horns. However the resulting production of tone when the box is completed and working might be surprisingly good.

The next in line for preparation is the top. The top, like the bottom, will have four, 15-inch pieces of 1 by 1 attached to the side of the board which is not the good side. The four ribs will be set in ¾ in. from the edge on all sides and, of course, parallel with the sides. These ribs are then fastened with glue and screws as was done for the bottom.

Each side will have two 24-in. ribs, one fitting flush to the edge and the other being placed ¾-in. in from the edge. In one side I have drilled a small hole in which is a plug for connecting the speaker with the tuner.

Preparing the back is easy. Since the back is screwed on from the outside, drill six holes ½ in. in from the sides (three holes on each side and in line with the ribs attached to the sides of the cabinet).

The next step before proceeding to put the box together, is to apply the gray grained Kontact paper upon all surfaces that will be showing except the bottom and the 16-in. black panel of the front board. If one decides to finish the cabinet with paints or varnishes, it may be desirable to put the box together first.

All the pieces ready for assembly, simply start with the bottom and screw one side to it (all pieces are screwed to each other from the inside of the box). Then the front. Now pull together with screws the side and front. The other side should then be attached to the bottom and then to the front. The top is next. Placing the top on may be a little difficult because of limited space, but it can be done. The back can remain off until the speaker has been put in place.

The grill cloth and molding are the last items to be assembled. The grill cloth should be cut to the correct size and then stretched very tightly across the panel and opening on the front. The cloth is held with small flathead carpet tacks. The molding can then be cut to the correct lengths. Miter the corners and nail in place with small wire nails. Countersink the nails and cover with wood filler. After the filler dries, touch up the spots with gold paint.

The cabinet is finished and is ready to have a 12 in. speaker installed in it. When installing the speaker, which is held by screws, be sure to place between the speaker frame and the wood some sort of padding. I suggest strips of foam rubber.

My whole *Hi-Fi* unit cost only $87: the cabinet $20, radio and speaker $32, and portable record player $35. I am very proud of the tone quality the speaker and cabinet produce and you can also be a proud listener. The technical name for the cabinet is an eight cubic foot infinite baffle speaker cabinet.

One of the ingredients in the special ink used by Currier & Ives was shellac. Today shellac is still used in special inks. — *Shellac Information Bureau.*

COLLAPSIBLE BOOKSHELF

PAUL T. JASKSON

Toledo, Ohio

While I was home during a vacation period from school, I decided that I would try and build something to hold all the books I had been accumulating.

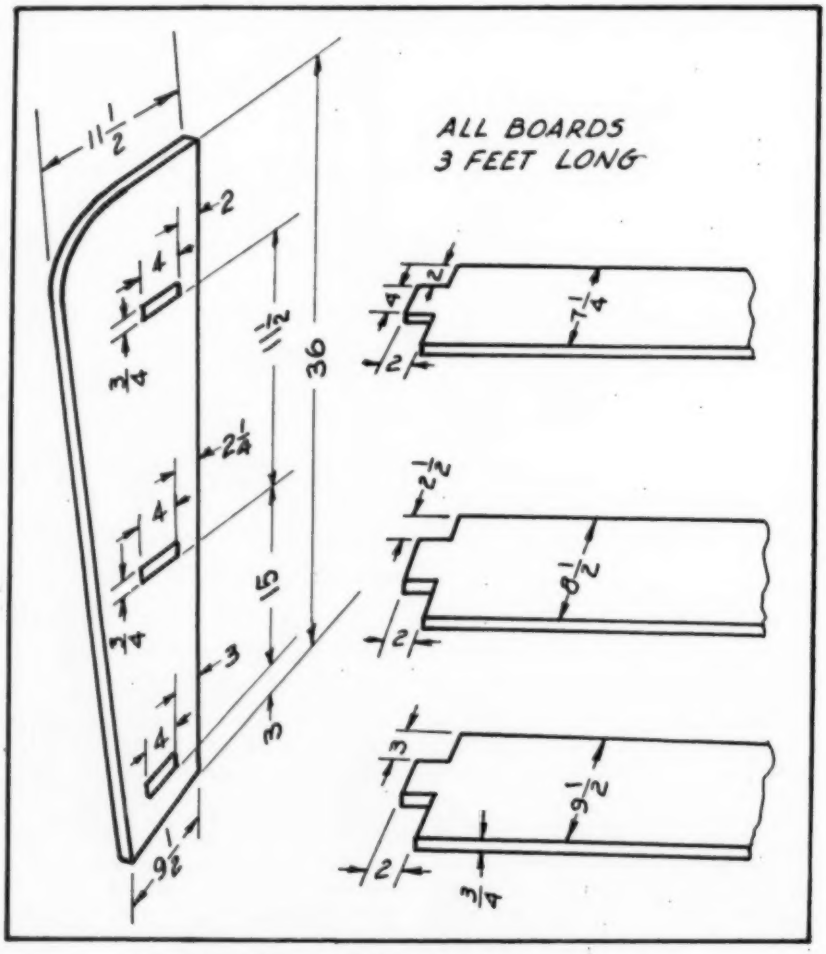
This project was very much worth while, not only because it holds a great many books, but also because it is very easy to make, it can be transported with little difficulty, and it is a very nice-looking piece of furniture.

MATERIALS

Needed to buy; One ¾-in. board 12 in. wide and 15½ ft. long (I used redwood.)

I am assuming that one has on hand in the home workshop a bench saw, a jig saw, abrasive paper, steel wool, and finishing materials such as stain, shellac, varnish, and wax.

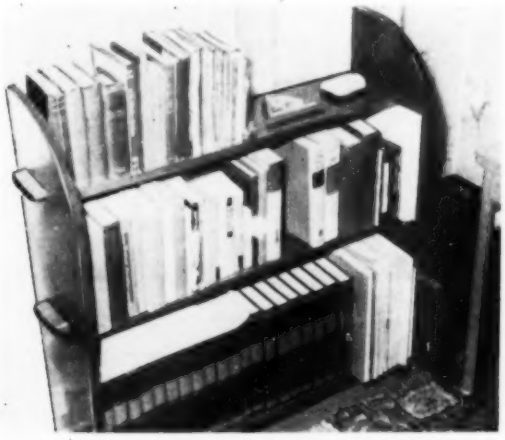
Redwood is very soft wood and may be difficult to work without splitting little pieces off the edges of the board. Therefore, if redwood is used, one must take



Detail drawing of the collapsible bookshelf

extra care when making cuts with the saw.

The first thing I did, was to cut 5 lengths of 3 ft. each from the 15-ft. board. Thus, I have used boards of equal length to make my bookshelf. Two of the boards became the sides, the other three became the shelves on which the books stand.



The bookshelf in use

In shaping the rounded edges of the two sides, I drew a freehand pattern that I placed on the two boards and traced. The curve starts immediately from the back corner and rounds around to the front edge of the board at a point 6½ in. from the top. From this point a straight slanting line was drawn to the bottom of the board and cut, giving a width at the bottom, from back to front of 9½ in. When I finished cutting the shape of the two sides, the curve with a jig saw and the slant with the bench saw, I found where I would like to have the slots in which the cross boards or shelves would fit (so my books would fit in between the shelves) and cut them out with a jig saw. These slots (see diagram) were ¾ in. wide and 4 in. long. (Right here it is necessary to say that the boards should fit tightly into these slots, but yet loose enough to fit together without force. The boards will be a bit thicker after shellac and varnish have been applied, so it may be necessary to sand out the slots a bit.) The bottom slot is 3 in. above the floor (or from the bottom of the board) and is in 3 in. from the back. The next slot is 18 in. above the floor and 2½ in. in from the back. The third and top slot is 29½ in. from the bottom and 2 inches in from the back. Thus there are three slots in each side which coincide with each other.

The cross boards or shelves were the last to prepare. The bottom shelf is 9½ in. wide. On each end of the board a tongue 2 in. long and 4 in. wide was cut to coincide with the bottom slots of the sides. The middle shelf is 8½ in. wide and the tongues are cut in the same way as those of the bottom. All three shelves are flush to the back of the sides so just as the slots are in a steplike position, so will the shelves be like steps. The last and top shelf was cut down to 7¼ in. wide with the 2-in. tongues on both ends cut to coincide with the slots.

All the boards, after they were sanded smooth, were stained with a cherry stain to highlight the grain of the wood. After the stain was dry, I finished the five boards with three coats of shellac and two coats of varnish. After each coat dried, I rubbed it down with steel wool. The last coat of varnish was rubbed down and then waxed.

The boards were transported back to school — flat — and then simply fitted together into a three shelf bookshelf.

AN ATTRACTIVE PAPERWEIGHT

PAUL T. JACKSON

Toledo, Ohio

At college, I have found my desk at times covered with little notes written by me to myself. There have been notes from my landlady asking me to do things. There have been letters which needed answering. And there have been appointment cards from the dentist. With all these things on my desk, it became necessary for me to organize my notes and letters. I had one paperweight under which I put many important documents that needed my attention *tomorrow*. But what about those notes and requests that had to be done *today*?

While I was at home one week end, I found a box of washers all the same size. They gave me an idea, and I proceeded to put this *idea* to actual use. The idea was, "Why not a paperweight made of these metal washers?" I could use another weight for those things *to be done today*.

Here is how I made the paperweight of metal washers.

MATERIALS LIST

5 metal washers 3/16 in. thick and 1 in. in diameter
Hobby cement (metal glue)
Gold or silver paint (or any other color desired)
Steel wool and a clean cloth
A heavy weight or a vise

First, prepare the five washers by taking all dirt and rust off with steel wool. Wipe the washers off with a cloth, making sure all loose particles and fine steel wool are wiped away. Now, on a clean paper lay the washers out and apply hobby cement to all sides except the two sides that will make the two ends of the weight. Put the washers (with applied glue) together and press them with a weight or a vise. After the glue has had time to dry, take off the rough edges with steel wool or abrasive paper or cloth. When this is done, clean the paperweight off again with a cloth and then paint the weight whatever color is desirable. Allow plenty of time for the paint to dry. When the paint is dry, you will have an inexpensive, useful, attractive paperweight.

Now I have things organized: under paperweight No. 1 — "important things to consider," under paperweight No. 2 — "important things to do today."

WHITTLING PROJECT — HOPI KACHINA DOLLS

BEN HUNT

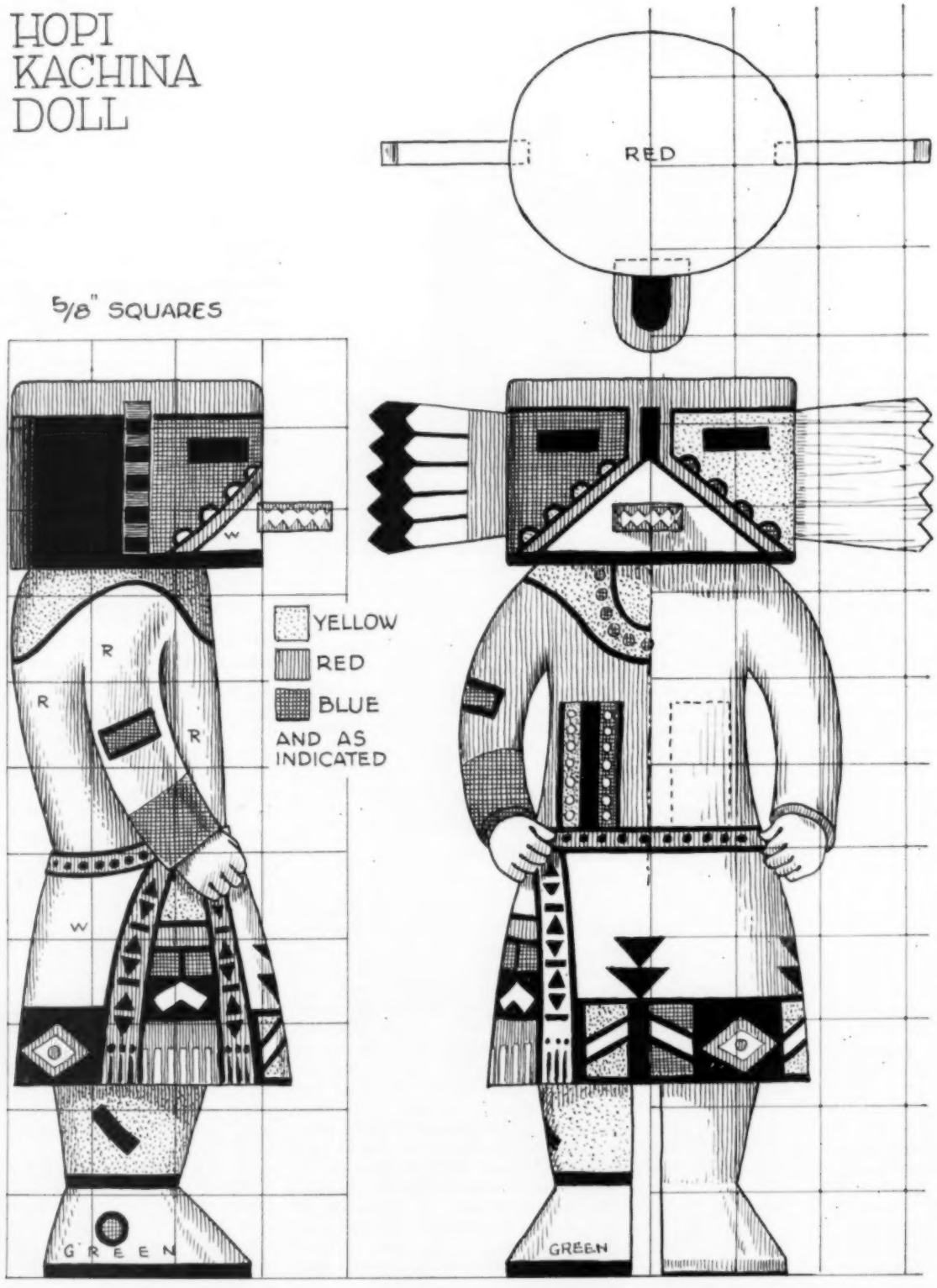
Hales Corners, Wis.

Right here in our own country we find three very interesting styles of art as it was, and to a certain extent still is, practiced by our American Indians, which we call primitive art — the Northwest coast with its totem poles and intricate masks, the Iroquois masks of our Eastern states, and the kachina dolls of our Southwestern states. Of the three, the Hopis are still keeping up their carving, perhaps to a greater degree than formerly, since these dolls have a ready sale in the Pueblos and trading posts. Although these dolls represent the Hopi gods, they have no religious significance other than that fact. They are made to give to the little girls and tend to teach them what they represent. In all there are somewhere near 250 kachina gods, but there are only a comparatively few that are made up in the form of dolls. Some are quite simple and others are rather complicated, and as a rule, the better ones are whittled out of cotton wood roots.

The two shown here are good examples of the better ones. They are made in all sizes from about 3 and 4 inches high, to dolls measuring up to 15 and 16 inches tall. These two measure 7½ inches high, the side ornaments and the feathers adding an inch or more.

Not having cottonwood roots, we make them of pine or bass. In making the

HOPI KACHINA DOLL



smaller ones the only work done mechanically is to saw the slot for the legs (A). The rest is simply done with a pocketknife. After the doll proper is whittled and sanded, such appendages as hair ornaments, etc., are glued or tacked on. Sometimes even the arms are done separately and glued on.

The Indian invariably paints the entire doll with white paint first but I find, with good poster water colors, it is better to mark with a pencil, the various ornamentations on the bare wood and then paint them. Painting them is not so difficult as it may seem, since there is no shading.

I have tried to show modeling and decorating on one and the same drawing, and hope I have made it clear enough. You will note that one doll (A) is finished with orange, and on the other, red is used. The blue is a medium shade to contrast with the black on the light side rather than the dark side.

When the paint (water colors) is dry, I like to give them a light spray coat of clear lacquer or plastic to prevent the color from smudging when handling. However, do not under any circumstances give them a glossy finish as that would really spoil them.

Where feathers or fluffs are used, they are inserted in a small hole, made with an awl, or just glued on. Almost any kind of small feathers are used. Those used in (A) are part of a dark blue fluff.

Hopi Kachina Dolls

(See details on pages 284 and 287)

The current move is to fix floors damaged by outdoor abrasives tracked into the house during the summer.

—*Shellac Information Bureau.*

ADAPTABLE DESIGN COFFEE TABLE

G. KENT STEWART
Eastwood Junior High School
Indianapolis, Ind.

Very often we design and construct a project in the school shop which can be used with only one style of furniture. The design of this particular coffee table can be altered to match any of several styles of furniture. For example, the leg design and height may be changed to one of several designs including the turned, curved, or even the wrought-iron legs. The edge and end trim may be varied to suit a particular room of furniture. Last, but by no means least, the type of wood used in the construction of this piece of furniture and the finish applied to it contributes much toward enhancing the general appearance and beauty of the room in which it is to be used.

The accompanying drawing shows a design that is popular with the boys in my own shop situation.

BILL OF MATERIAL

Part No.	*No. of Pcs.*	*Description*	*Size*
1	1	Top	¾ x 19¼ x 35¼
2	2	Edge trim	¾ x 2½ x 36
3	2	End trim	¾ x 2½ x 20
4	4	Legs	1¼ x 1⅜ x 13
5	4	Leg supports	¾ x 3 x 3
	8	Screws	1½ No. 9 f.h.b.
	8	Screws	1¼ No. 9 f.h.b.

Plan of Procedure

1. Get out stock for top (Part 1).
2. Glue up stock for top.
3. Reduce top to dimensions shown.
4. Have instructor check this, especially for squareness.
5. Get out stock for edge trim. Remember two must be made. (Part 2).
6. Reduce edge stock to dimensions.
7. Cut grooves in the two pieces of trim according to the dimensions shown.
8. Cut the end miters being careful that they are accurately done.
9. Check to make sure they fit the edges of the top properly.
10. Have the instructor check these parts.
11. In a like manner, repeat the steps five through ten for the end trim (Part 3).
12. Get out stock for the legs. Remember that four must be made (Part 4).
13. Glue up the necessary stock to make the legs if they cannot be cut from solid stock.
14. Reduce this stock to the proper dimensions.
15. Cut the taper on each leg being sure to taper only two sides.
16. Have the instructor check this work.
17. Cut the end rabbet on each leg as shown.
18. Have the instructor check this work.

Fig. 2. This table fits in nicely with this living room furniture

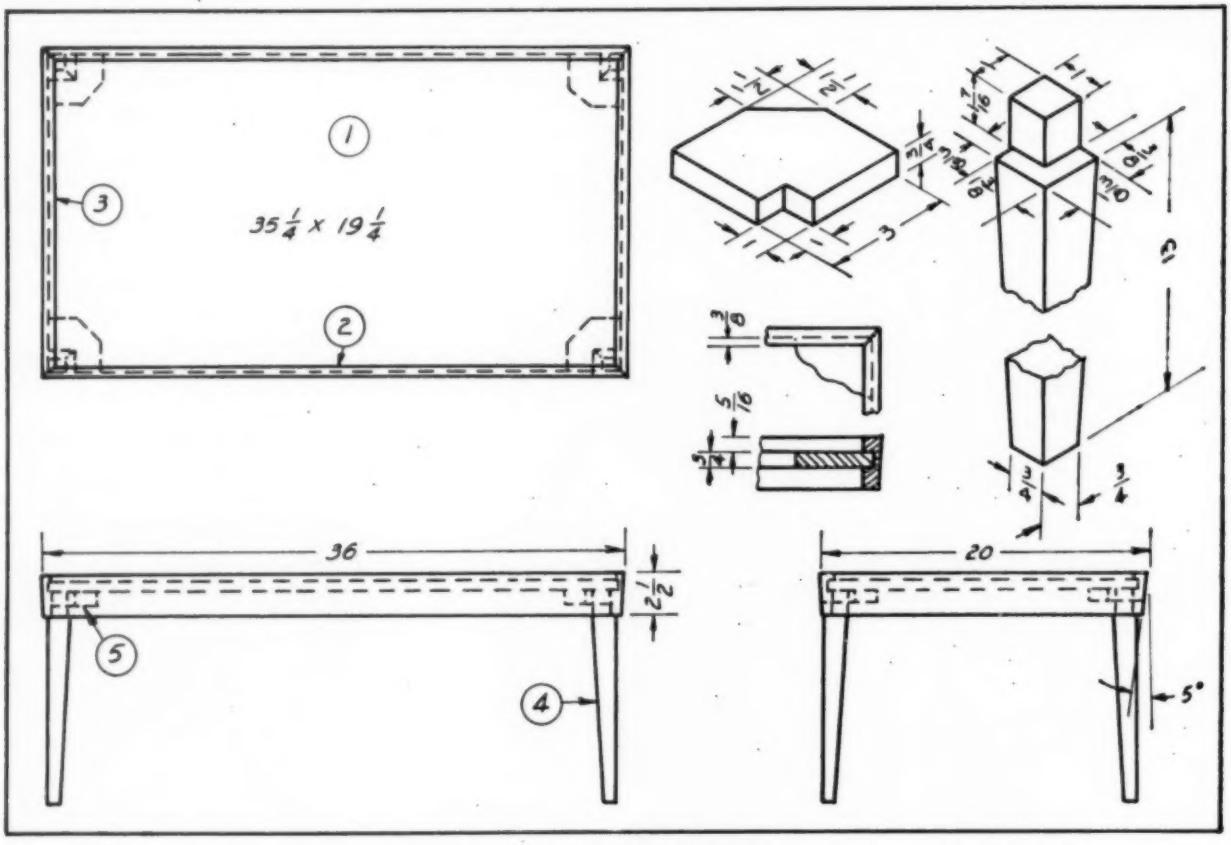


Fig. 1. Details of coffee table

19. Get out the stock for the four leg supports (Part 5).
20. Reduce stock to dimensions.
21. Cut out notch to receive legs as shown.
22. Cut miter across the opposite corner as shown.
23. Have the instructor check this work.
24. Scrape all blemishes, mill marks, and so on off the top, top edges of the trim, and the legs with the cabinet scraper.
25. Sand these parts with 2/0 Garnet paper.
26. Sand these parts again with 4/0 Garnet paper.
27. Finally sand these parts with 6/0 Garnet paper.
28. Have the instructor check this work.
29. Glue the edge and end trim around the top. Your instructor will help you employ the best method to perform this operation.
30. Cut the 5-deg. taper around the trim as shown. The jointer will perform this operation very satisfactorily.
31. Scrape this with the cabinet scraper.
32. Sand this as explained in steps 25 to 28 above.
33. Drill holes in the legs in order that they may be screwed on to the inside of the trim. One screw into the end trim and one into the edge trim (use the 1½-in. screws for this.)
34. Place glue on the leg joints and screw in place.
35. Drill holes in the leg supports in order to screw them to the bottom of the top.
36. Place glue in the notch and on the supports and screw them in the corners under the table. Make sure they are tight against the legs.
37. Have the instructor check this work.
38. The table is now ready to be finished. Consult your instructor as to the type of finish to be used and the procedure to be followed in finishing your table.

ENRICHMENT IN DRAFTING

WALTER P. BUSCH
Industrial Education Department
Woodrow Wilson Junior High School
San Diego, Calif.

All teachers of industrial arts try to teach the basic skills and units of instruction for each grade level. But we have pupils in our classes capable of doing more than the required goals so we must meet that challenge by giving advanced material and information. One of the best incentives the past several years has been the national contest for all areas of industrial arts under the heading of Industrial Arts Awards. We as teachers are not contest conscious but for the advanced and more capable pupil in the class this gives an enrichment area for the teacher that is able to give out much more than is required for the average class standard.

After several weeks of regular class work the spread of abilities within the class begins to show up. The teacher can give individual guidance as to interest and willingness to work on a problem for a national contest and to interest in fields correlating with drafting. If the interest is in the affirmative the writer gives the student a form sheet entitled Tips on Techniques to follow for special study. This procedure does at least two things to everyone receiving it:

1. It recognizes the worth of the individual and lets him know he is capable of doing more than is expected of the average.
2. It gives the pupil a feeling of importance to be chosen.

Grades to a pupil are like pay checks to adults. They need them but how the individual is accepted and recognized while on the job is more important than the grade or pay. Encouragement, recognition, and consideration give more incentives than all the demands will ever give. When you encourage a pupil you endow him.

Tips on Technique

Do not crowd drawing. Balance evenly on the sheet. Use ample size sheet.

When a number of circles are to be drawn from the same center, place the compass point on a small piece of celluloid to avoid making a large hole in the paper.

When erasing a drawing, slip a piece of thin fiber or other hard material (triangle) between the paper and the backing sheet; lines will then erase much more effectively.

A spring paper clip attached to a triangular scale makes it easy to select the proper edge every time.

Keep your paper clean, spread preparation on working surface before beginning the problem — "Scum X," "Dandy Rub," or "Kleen." (After each day's work place the material in an envelope until it becomes too dirty to work well.)

Remove lead dust (graphite) from your pencil point with a cloth after each sharpening.

Keep drafting instruments clean. T square may be cleaned with steel wool or eraser and triangles may be washed with soap and water. (Carbon tetrachloride is the best *but* great care must be exercised to see that pupils do not inhale the fumes.) An ideal pencil holder may be made by corrugating stiff paper or thin cardboard and labeling the degrees. Extension lines should be 1/16 in. from the object and extend approximately 1/4 of an inch beyond the arrowhead.

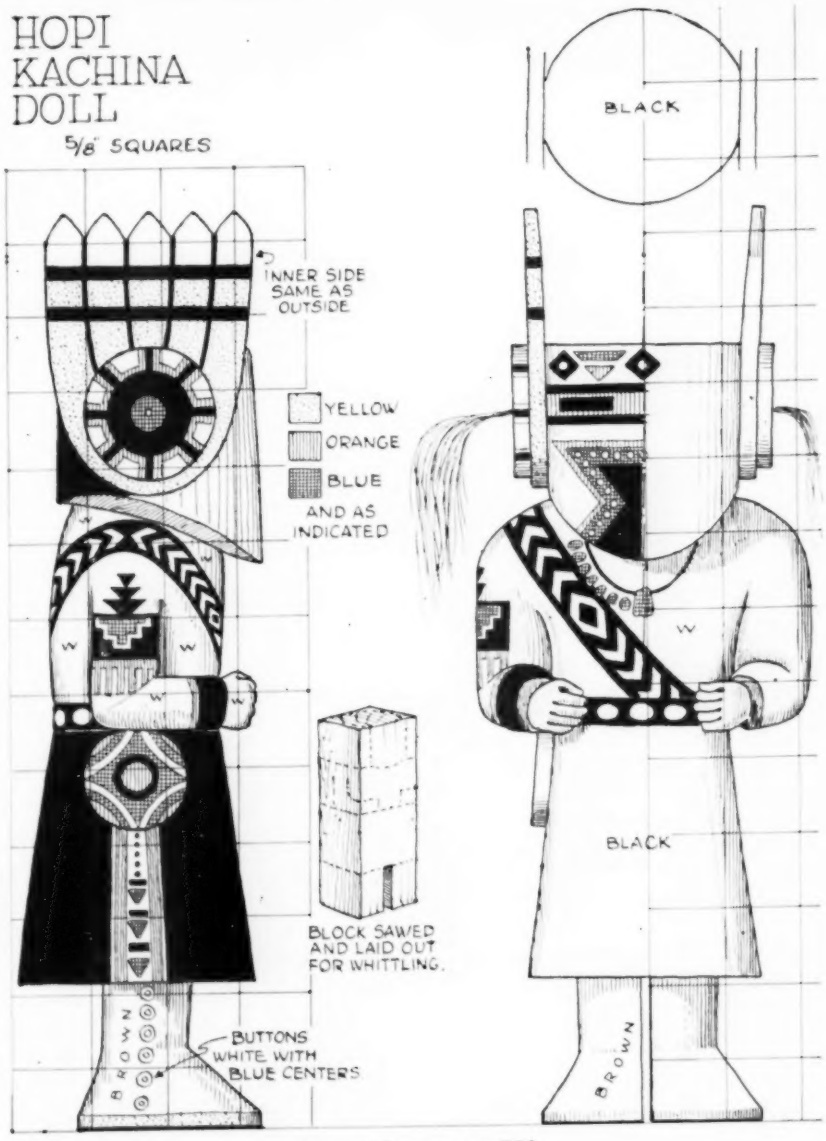
Keep your drawing clean by keeping your fingers *off* the paper. Cut a hole in the center of a piece of scratch paper for lettering. Place a 3 by 5-in. card under the heel of your hand when placing arrowheads and dimensions on your drawing.

An object should be dimensioned from the standpoint of fabrication rather than explaining how it was drawn.

Leads from pencil stumps can be saved for use in compasses. Carefully cut the wood from the lead.

Study carefully where notes should be placed.

Know how to make out a bill of material.



See article on page 283

DEVELOPING THE PROJECT FOR ADVANCED INDUSTRIAL ARTS CLASSES

GEORGE W. GENEVRO
Garden Grove, Calif.

The advanced high school industrial-arts student and his instructor often find themselves faced with the problem of selecting or developing projects to be made. The mere act of choosing *something to make* may seem to be a simple matter, but this is definitely not the case. The conscientious and forward-looking industrial-arts instructor realizes that the process of selecting projects is of great importance. The project, properly handled, is a powerful tool of instruction. Its proper and careful use, keeping in mind the basic objectives of industrial-arts education will serve to illustrate related information and bring to the student manipulative experiences that will acquaint him with our present-day industrial processes.

The alert and competent instructor will realize that he must keep abreast of the industrial and technical developments that are taking place in his particular specialty and in industry in general. Only by doing this will he be able to do a good job of incorporating new processes, ideas and materials into the advanced work done in his shop. The designs and processes of yesteryear have no place in the industrial-arts shop of today. The instructor who devises a course of study and a series of projects and uses them for a number of years without change and revision will inevitably find that he is teaching the materials of yesterday to the students of today in an effort to prepare them for the world of tomorrow.

In addition to considering the factors mentioned above, the instructor must also keep in mind the fact that his students are individuals and vary in ambition, temperament and ability. A little time spent in getting to know the students as individuals will help the instructor very much when he helps them plan their shopwork. If the student feels that the instructor is working with him toward a specific end rather than just telling him to do a job, he will almost

Fig. 1. Operating model outboard motor made by Douglas Bowman, Modesto High School, Modesto, Calif. Student made wood patterns as well as entire engine. Design details worked out jointly by instructor and student. Project awarded third place in advanced machine shop division, Ford industrial Arts Awards, 1957

Fig. 2. Drill press vise of welded steel construction was popular with students who had home workshop equipment. Made by Otis Applegate, Modesto High School, Modesto, Calif. A challenging project involving welding, machining, and heat treating operations

invariably react with more enthusiasm. This naturally results in a better learning situation and the project or job undertaken will increase in instructional effectiveness.

Naturally, educational value is one of the major criteria by which a project should be judged. It must achieve not only some or all of the objectives of industrial-arts education but it must also satisfy the objectives of general education. We must not forget that we are a part of the general education picture. In examining almost any series of projects, it will be found that many projects aiming at a common goal will vary in design and construction. This is not unusual and is a healthy sign of constructive and original thinking on the part of the instructor. Other factors that will cause projects to differ are availability of materials, differences in shop equipment, the skill and ability of the student and the method of approach to the problem used by the instructor.

Questioning the usefulness or utility of a project that a student wants to make is a rather common tendency among instructors. Evaluation of a project on this basis should be done with some care and an open mind. The hobby interests of the student or of some member of his family should be considered as well as the fact that the student may be of a creative nature and wishes to experiment with something different and out of the ordinary. It is very seldom that the author has tried to discourage a student from making a project on the basis of utility alone.

The instructor must do his best to see that the project selected challenges the abilities of the student and yet allows a good chance of success. This often calls for the use of a considerable amount of tact and diplomacy, especially with the few students who tend to overestimate their abilities. Generally speaking, it was found that the students who did well in their beginning and intermediate machine shop classes felt that they should have some freedom in choosing a *masterpiece* to be built during their senior year. Some instructors may think this to be presumptuous on the part of the student but one must remember that this may be the only real bid for recognition that the student makes during his entire high school career. This desire for success within the student, if properly handled by the instructor, can result in outstanding work. It was also found that successful completion of a major project and the subsequent recognition it brought to the student often resulted in improving the attitude of the student toward school and life in general.

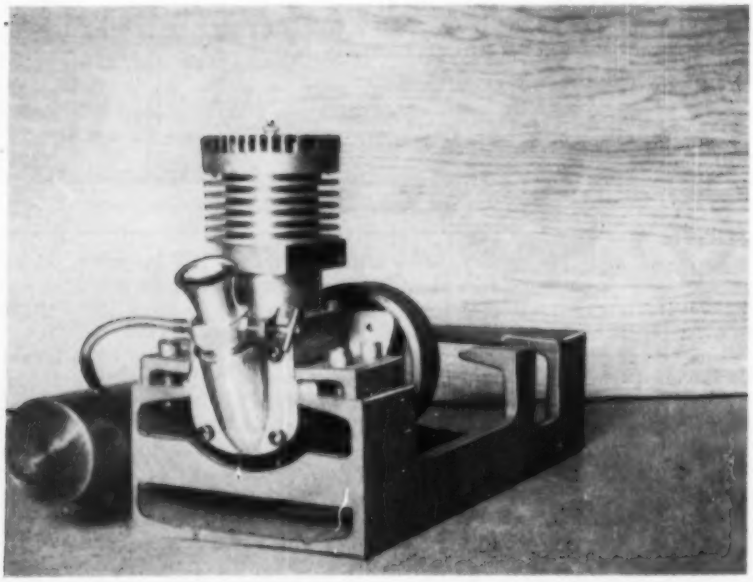


Fig. 3. Inboard model boat-racing engine made by Robert Soares, Modesto High School, Modesto, Calif. Student made basis engine and then did re-design and development work on various components to increase performance. Received Honorable Mention, Ford Industrial Arts Awards, 1957

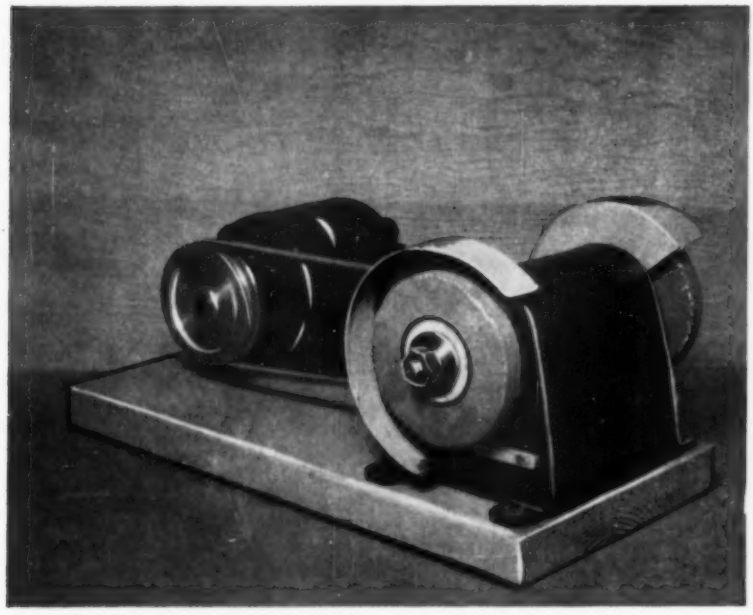


Fig. 4. Bench grinder built by Andrew Palleschi, Modesto High School, Modesto, Calif. A popular project for those students who wanted to add to their home workshop equipment. Design was simplified and improved as a result of student suggestions

The tendency of some students to underestimate their abilities and not to use their imagination often poses a problem for the instructor. Patience and careful encouragement will usually yield good results. This is particularly true in cases where the student is rather timid in nature or has been troubled by failures in some other subject matter areas. One of the best rewards in teaching is seeing a student who has been thinking in terms of failure begin to regain his self-confidence after completing a good piece of work and gaining new skills and knowledge. The other extreme, of course, is the student who is overconfident and overestimates his ability and wants to make some project that he cannot possibly complete successfully. Fortunately, not many students of this type find their way into the advanced industrial-arts classes.

Another problem that arises occasionally concerns the student who wishes to make a project which he obviously cannot afford. Projects of this nature are discouraged, along with projects involving many repetitious operations or which make use of only one type of learning process. Repetitious work has limited educational value and the limited exploratory experience it offers is not in keeping with the basic objectives of industrial arts education. It is the author's feeling that skills are important in industrial arts education but that becoming highly skilled in one area at the expense of exploration into other areas is inadvisable.

Quite often, the more advanced and able students ask to make projects that require a certain amount of research or experimentation. This type of project is enthusiastically encouraged as long as materials, time, and the equipment to do the work were available. As a rule, projects of this type required extensive discussion and planning before the actual work was started. It is obvious that large classes would not permit many research or experimental projects due to the large amount of individual attention required. The ones that were undertaken, however, proved most interesting to the student, the instructor and the class in general. The educational value provided by experimental class work could hardly have been derived from projects not requiring some original and analytical thought and planning on the part of the student as well as the instructor.

The value of the unusual project should not be underestimated. Many run-of-the-mill students will develop greater interest in industrial-arts shop and related work if they see outstanding and unusual work being done by the instructor and the good students. If the instructor does an occasional job in the shop that demonstrates a level of skill obviously higher than that of the best students, he will find that this is a good method of building up interest. It will indicate to the class that the instructor is vitally interested in the subject matter he teaches and his role in the classroom will be that of a leader rather than that of a person placed there to maintain order. The teen-ager of today is a naturally curious individual. If the instructor is adept at keeping interesting work in progress it is almost inevitable that some teaching by example will result.

The instructor who is receptive to new ideas and who is willing to try new processes and materials in the development of projects is giving his students experiences that will help them in later life regardless of the vocational field they choose. He is teaching them that progress as such is important and that the inquiring mind is the mind that brings to the world advances and innovations in the technical fields that are so important to us. In addition, the instructor will find that the process of planning projects and shopwork with his students is a pleasant and rewarding experience. Imagination and the will to experiment have always been potent forces on the American industrial and technological scene. The traits of imaginativeness and inquisitiveness cannot be developed in our students with the projects that father made in his manual-arts classes. The instructor who believes in the value of industrial-arts education knows this and realizes that the time devoted to creative work and looking to the future is time very well spent.

WATCHBAND

BOB REEVES

Chula Vista, Calif.

If you are looking for a simply constructed and practical metal project for your students try this watchband. It is made of just two pieces of 26 gauge stainless steel which are cut and bent to the proper shape. It should take but little time

The finished bracelet

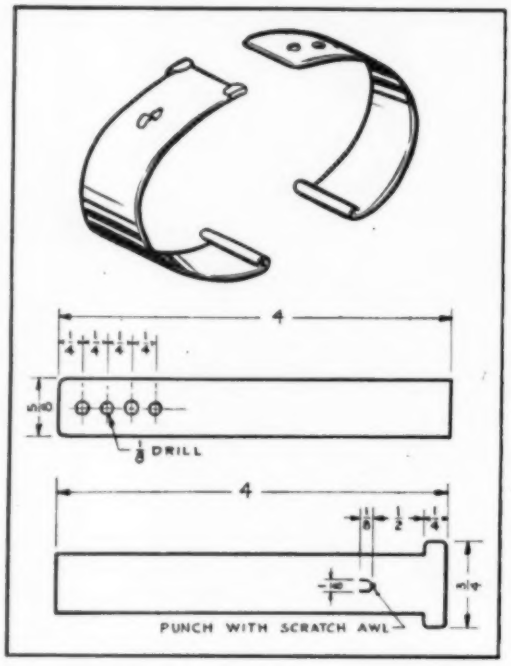
to make, and if reasonable care is used in the construction an attractive, durable, and very practical watchband should be the end result.

In cutting out the two pieces of stainless steel care must be taken to keep the material free of nicks and scratches. Stainless steel does not scratch readily, but once in, the scratches are difficult to remove.

After the metal has been cut to shape, and before it can be properly formed, there are several things that need to be done. First, the edges and the corners should be filed smooth and round as shown on the drawing. Locate the centers for the ⅛ in. holes very accurately and then drill. Now, punch the hole which serves as a starting place for the jeweler's saw blade. Using the jeweler's saw, cut as shown to form a tongue or flap which can be bent up later.

The bending of the various parts should be done with round nose or long nose pliers. If you have trouble with the pliers marking or scratching the surface of the metal just wrap a short length of tape around each jaw. Bend each part as shown, being careful not to cause any of the parts to bind one against another when they are fitted into place.

Now use a fast-cutting buffing compound and a power buffer to put a high polish on all edges and surfaces. Notice what a mirror-like shine can be obtained, and the nice thing about stainless steel is that it retains this shiny surface for an indefinite length of time.



Detail drawing of the watch bracelet

After one of your students has made this watchband be prepared to make more, for it has proved to be a very popular project.

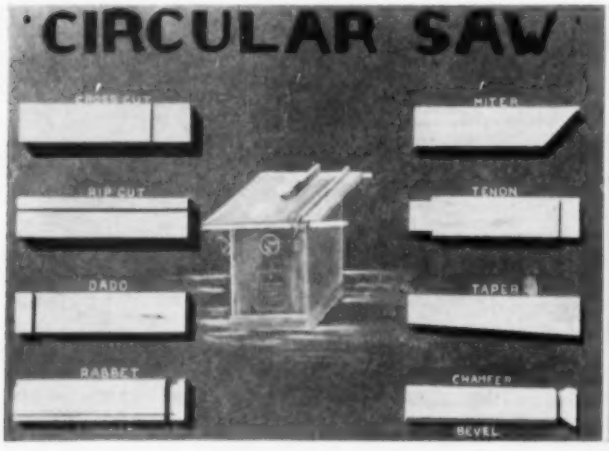
Watchband made of two pieces of stainless steel

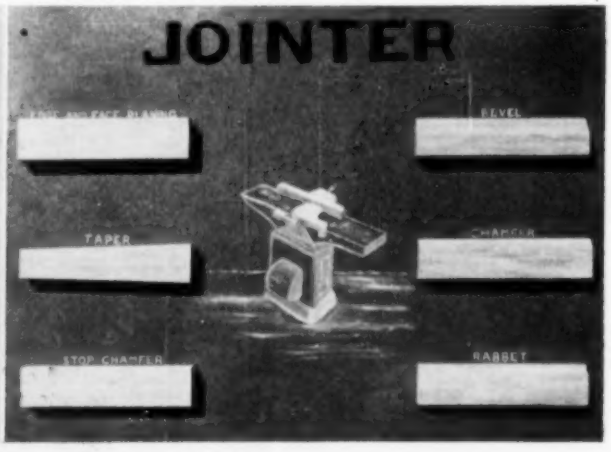
TEACHING AIDS FOR MACHINE WOODWORKING

MICHAEL JANKOWSKI
Abbey School
Canon City, Colo.

It is quite safe to say that of all the subjects taught in our schools, industrial arts is one that makes the greatest use of teaching aids. However, many teaching aids, especially in industrial arts, are frequently just museum or show pieces. Such pieces are not to be condemned, for they do play a part in supplementing teaching. Their use is limited because of their inaccessibility to the students. Their use is further limited by their complexity. A student may admire a particular project. He may even note one or two techniques that were used in the execution of the project. In the final analysis, the project is merely a project in the student's eyes. He does not see in it an example of the various techniques that the project was intended to reveal.

As all teachers are aware, the demonstration in the use of a particular machine is only partially effective. The teacher must resort to the use of supplementary materials which we term as teaching aids. The partial effectiveness of a demonstration is especially true when it is given to a group. The comparatively small area of a machine that is actually producing a desired cut is seen only momentarily by each student. The sample of the cut is passed around and examined. During the time in which the sample is being examined, many unavoidable distractions occur. For example, the teacher continues his "patter" in order to hold the students. The machine noises are slowly coming to a stop. The students who have already examined the sample are becoming restless. As the demonstration continues, each succeeding sample presented to the students, dims the student's impression of the previous sample. The only way that impression can be revived is by either seeing the sample again in association with the machine that performed the cut, or by actually performing the operation. The latter condition will occur only if and when the student has the need to perform the particular operation in conjunction with the project upon which he is working. Instead of relying





Figs. 1 and 2. Teaching aids for machine woodworking

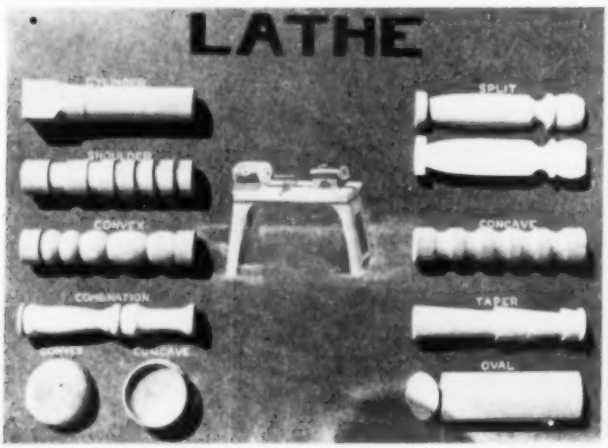


Fig. 3

Fig. 4

upon the knowledge he should have acquired through the demonstration of the machine that should be used for a particular cut, he will invariably lean upon the teacher for the information already given. Without a doubt, the demonstration lacks a cohesive factor that will integrate. Such reliance upon the thinking processes of the teacher results in uncalled for amounts of repetition. Such reliance defeats one of the purposes of education, namely, that pupils should acquire the techniques of problem solving. All teachers, even the best, have been confronted with this problem at one time or another.

Having been confronted with this problem, the writer has attempted to solve it in the woodworking machine area, by devising a set of teaching aids that will emphasize, clarify, vitalize, and integrate instruction.

What Are Teaching Aids?

An object that is to be used as a teaching aid must possess certain qualities and must fulfill specific requirements. Emanuel E. Ericson stated:

> . . . Teaching aids will be thought of as physical means used by the teacher for the purpose of strengthening the instruction and making it effective. Under this interpretation "teaching aids" will be differentiated from "teaching techniques," in that the latter constitute procedures used by the teacher in giving instruction through various teaching methods, while teaching aids are things or objects brought into play to emphasize, clarify, or vitalize the instruction.[1]

We may add to this definition by saying that teaching aids should integrate or unify the total instruction and also should be a quick and ready reference available to the students.

Too often, speech is used as a sole means of aiding the learner in the acquisition of knowledge. The learning process is considerably simplified and speeded up if the teacher judiciously uses means that will stimulate the learning process through as many senses as possible. In the field of industrial arts, the senses of touch, hearing, and seeing can be used simultaneously and frequently. The very nature of teaching (visual) aids dictates that such aids must appeal to the sense of sight. Consequently, the objective is to seek aids that will exert the most influence through the sense of sight. Aids possessing a three-dimensional quality are more effective than single-dimension type of aids, such as photographs.

Weaver and Bollinger in their book, Visual Aids,[2] stated that there are specific ways in which teaching aids influence the learner. They listed some of these specific ways as: (1) They attract attention and hold interest. (2) They aid retention of information and visual images. (3) They assist in forming correct images. (4) They assist in understanding proper relationships of component parts. Verne Fryklund and William Micheels,[3] considered that teaching aids, in order to be satisfactory, must possess certain qualities. Summarizing these qualities, they can be listed as follows: (1) They must be large enough to be seen by the entire group. (2) The important parts should stand out. (3) Only the essentials

[1]Emanuel Ericson, *Teaching the Industrial Arts* (Peoria, Ill.: The Manual Arts Press, 1946), p. 148.

[2]Weaver and Bollinger, *Visual Aids* (New York: D. Van Nostrand Co., 1949), pp. 5-8.

[3]Silvius and Curry, *Teaching Successfully* (Bloomington, Ill.: McKnight & McKnight, 1953), p. 81.

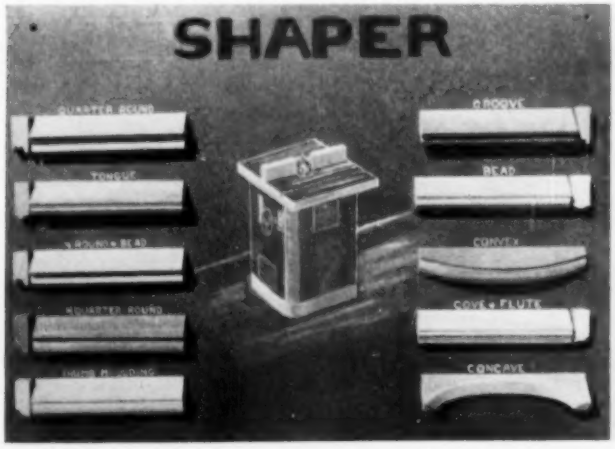


Fig. 5

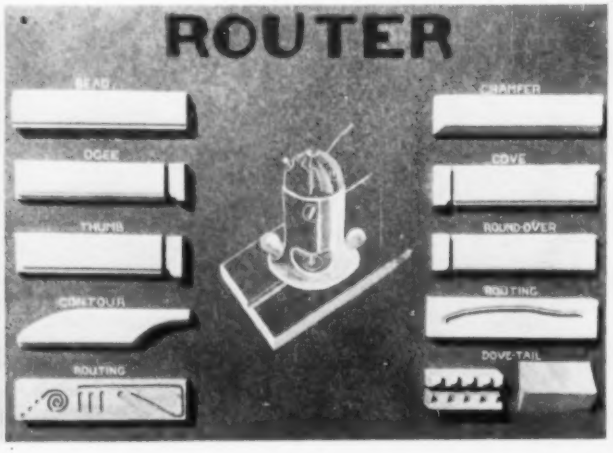


Fig. 6

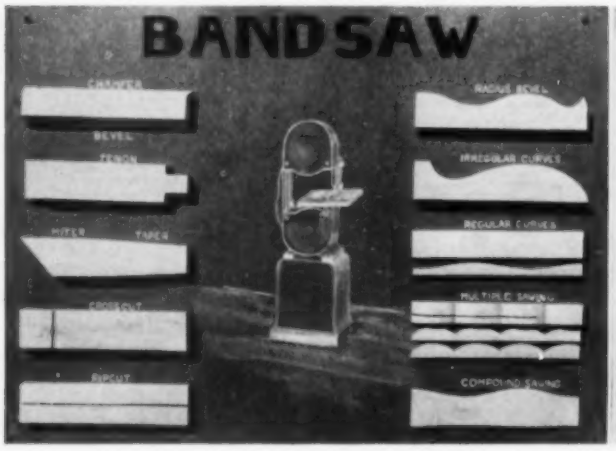


Fig. 7

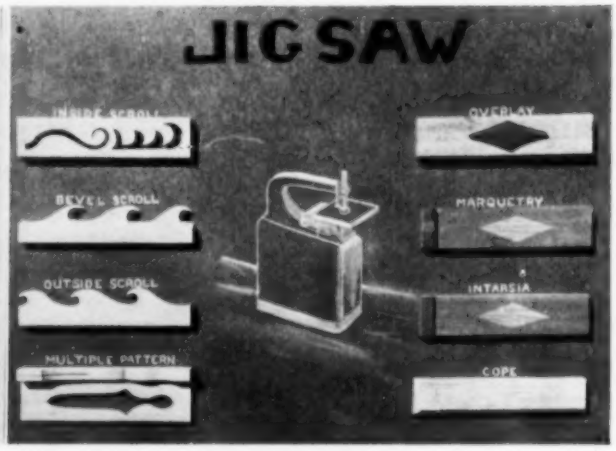


Fig. 8

are included. (4) They should be used for specific instructional purposes. (5) All lettering and notes should stand out. (6) They should be durable and strongly constructed. The above teaching aid characteristics were used as the foundation for the formulation and construction of the panels described in this article.

Machines Studied

The machines used and the variety of uses for each machine was determined on the basis that the panels would be used in junior and senior industrial arts high school courses. Shops and laboratories in the above-mentioned school group usually have what are called, adequate woodworking machines. This group of machines consists of the circular saw, jointer, lathe, drill press, shaper, router, band saw, and the jig saw.

Machines such as the mortiser and the thickness planer are not included as they are not commonly found in school shops. Sanders, grinders, and similar power tools are excluded because their operation is comparatively simple and their use does not require supplemental aid.

Some machine uses have not been included simply because, in the writer's mind, they are not safe and are usually performed more safely on a machine specifically designed for the operation. As an example, planing can be done on a drill press with a special planing attachment. It is a hazardous operation when performed by this method. The jointer and the thickness planer (surfacer) are designed for planing operations. Therefore, the planing operation as performed on the drill press is not included on the drill press panel.

Combination techniques, such as the use of a router in conjunction with the lathe to produce veining on cylindrical work, are likewise excluded on the basis that such samples could cause confusion in the student's mind. Veining is shown on the router panel and cutting of a cylinder is shown on the lathe panel.

Panel Make-up and Construction

The panels described in this article consist of three features, namely, background, samples, and graphics. The background, or main support, is made of a sheet of 24 by 36-in. tempered Masonite, a tough material of a dark brown color. Masonite was chosen because it is tough and will withstand a great deal of handling and the dark brown color is exactly the shade of brown that fits in with the planned color scheme.

The second feature of each panel is the material employed for the samples. Two by nine-in. blocks of wood were used. This size is large enough to illustrate each machine operation completely and still small enough to avoid bulkiness. The light color of Korina contrasts well with the Masonite background. Consequently, Korina was chosen for the samples. Where additional contrast was needed, as in the case of inlay work, mahogany was selected in order to utilize its reddish color to contrast between both the Korina and the Masonite.

The third feature of each panel consists of the graphics, that is, the lettering and illustrations. The title lettering is in vermilion outlined in black. The descriptive lettering is in chartreuse. White, black, blue, and gray were used in painting the central illustrations.

The entire color scheme was carefully worked out to attract the eye and guide it in a predetermined fashion in order to attain certain desired results. The eye is first drawn to the dark vermilion title, where it rests momentarily and then descends to the Korina samples. From the samples, the eye travels to the centrally located illustration and then back to the samples. The cycle of title to samples to illustration continues for several moments resulting in a retentive association of ideas, namely, the association of the title with the samples and the illustration. After this the eye seeks rest and is drawn to the chartreuse descriptive lettering, distinctive in coloring, but possessing sufficient yellow to relate it to the creamy color of the Korina samples.

The samples were fastened to the panels by means of glue and wood screws. The flexibility of Masonite had a tendency to loosen samples that were held by glue alone. Therefore, wood screws were used in addition to the glue.

All the lettering was done in lacquers, not only because of the speed with which lacquers dry but also because of the brightness inherent in lacquers.

The panels were finished with two spray coats of satin finish varnish.

Panel Contents

As mentioned before, the woodworking machines considered in this article are the circular saw, jointer, lathe, drill press, shaper, router, band saw, and the jig saw.

Each of these machines together with an illustration of the common operations performed on it, is represented on a panel. In presenting these panels, no specific order is followed because in demonstrating wood working machines the teacher usually follows an order most suitable to his specific needs.

Circular Saw. (Fig. 1)

The circular saw is considered to be one of the most versatile machines available to the woodworker. Its versatility ranges from simple cuts made by a sharp-toothed circular blade, to intrincately shaped edges, made by a shaper head. Though the circular saw can perform a variety of different operations, only those commonly used are presented on the panel. A specific cut such as shaping is not represented because a machine, a shaper, is specifically designed for this operation. If a shaper is not available, the instructor may use the shaper

panel, as a supplement to the circular saw panel.

Ten different cuts, or operations, are shown in sample form. These cuts are: rip cut, cross cut, dado, rabbet, groove, miter, tenon, taper, chamfer, and bevel.

Jointer. (Fig. 2)

The purpose of the jointer is to plane either the edges or the face of a board. Refinements in the construction of the jointer have made it useful in the production of such cuts as the chamfer and the rabbet. There are six jointer operations shown on the jointer panel. These are: face and edge planing, taper, stop chamfer, bevel, chamfer, and rabbet.

Lathe. (Fig. 3)

Except for refinements, the wood-turning lathe of today remains basically the same as its forerunners, producing wood in the round. The lathe panel shows samples of ten various cuts that can be produced. These are: cylinder, shoulder, convex, combination, convex (faceplate), concave (faceplate), split pattern, concave, taper, and oval.

Drill Press. (Fig. 4)

The drill press was originally intended for drilling holes. However, various other uses have been found for this machine. It is used not only for boring but with various attachments and adapters it may also be used for mortising, routing, shaping, sanding, planing, grinding, and a variety of other purposes. The drill press panel contains samples of operations such as boring, countersinking, routing, contour shaping, regular shaping, shallow boring, plug cutting, and mortising.

Shaper. (Fig. 5)

This machine is used to cut moldings and similar decorative grooves on the edges and sides of boards. The material being shaped can be straight, convex, or concave. The variations in cuts are innumerable. A sufficient variety of cuts is presented in sample form to give a good idea of what can be done on the shaper. These cuts are: quarter round, tongue, quarter round and bead, half round, thumb molding, groove, bead, convex, cove and flute, and concave.

Router. (Fig. 6)

The router operates on the same principle as the shaper. The type used for this article was the portable because it is more versatile than the stationary type of router. All the possible cuts and variations are not shown for the obvious reason that they are innumerable. The router panel should contain a representative number of samples showing cuts such as: bead, flute, ogee, thumb, contour, plain routing, chamfer, cove, round-over, recessed routing, and dovetail construction.

Band Saw. (Fig. 7)

Even though many of the cuts that can be made on the band saw are usually obtained by means of the circular saw, they are included, or repeated on this panel, because the band saw is quite frequently used as a substitute for the circular saw. Such substitution may not be ideal but at times is preferred, especially when thin material is being cut. Samples illustrate: rip cut, bevel, chamfer, tenon, miter, taper, cross cut, radius bevel, irregular curve, regular curves, multiple sawing, and compound sawing.

Jig Saw. (Fig. 8)

The primary purpose of the jig saw is to produce inside cuts or pierced work. The samples on the jig saw panel show such operations as: inside scroll, bevel scroll, multiple pattern, outside scroll, overlay, marquetry, intarsia, and coping.

Using the Panels

The basic use of these panels is in conjunction with the demonstration. It is suggested that a 6 or 7-ft. high tripod of the easel type be used as a support for the panels. The placement of the tripod is of some importance. Obviously, it cannot be placed where it will be in the way of either the instructor or the students observing the demonstration. The most suitable place would be behind the instructor, so that the instructor will be between the panel and the machine being demonstrated. In this position the instructor can readily refer to the panel without undue movement either on his part or on the part of the students. The one exception to this placement is in the case of demonstrating the use of the woodworking lathe. In this instance the tripod mounted panel should be placed alongside the lathe.

The operation or operations to be performed are first pointed out on the panel, then the actual operation is performed on the machine. Thus the student first sees what a particular cut is like and then he is shown how it is obtained.

When not in use as demonstration aids, the panels should be hung upon a wall or stored in a place that is available to the students so that they can use them to determine what machine or machines should be used in producing the cuts called for in their projects.

With a change in the method of mounting the samples, another use can be made of these teaching aids. Instead of mounting the samples permanently with glue and screws, friction catches can be used. The catches are mounted on the panel and the ball is recessed into the sample. Since all the samples are of a comparatively uniform size, they can be scrambled on the panels and used for testing purposes. The problem would be for the student to properly relocate each sample, thereby, helping the student to identify specific cuts with specific machines. In addition, there would be a furthering process in his ability to associate the sample with the proper name.

Conclusion

The teaching aids presented in this article will emphasize, clarify, vitalize, and integrate instruction. They possess such important qualities as: largeness, three dimensional effect, contain all essentials, design for specific purpose, durability, and the labels stand out.

For effectiveness these aids should be used as teaching aids in conjunction with the demonstrations and they should be made available to the students.

OLD INGREDIENTS – NEW MATERIAL

GERALD G. JACKSON
Bloomington High School
Bloomington, Ill.

The idea described herewith was conceived after reading an article in an old issue of *Popular Science Magazine*, titled "Man-made Lumber Better and Cheaper Than Natural Wood." In this article it was reported that the Souhegan Mills in Wilton, N. H., were grinding up the saw mill waste and gluing it together under heat and pressure. After reading this article, the writer decided to try to glue sawdust and planer shavings together in a brick that would be suitable for the making of small projects.

Experimental Data

In the previously mentioned article, resin glue was used. The writer made the assumption that more water would be needed in the glue mixture than the directions on the can indicated. This assumption proved false because when the first mixture was pressed, the water oozed out, taking a lot of glue with it. The second experiment proved successful.

Several experiments followed, using less and less glue. The idea was to reduce the glue to the minimum and still have a satisfactory product that would compare somewhat with softer woods in hardness and strength.

In some experiments, light and dark wood shavings were used. This mixture produced a mottled surface which resembled marble.

The final experiment that was made involved three different kinds of glue. Three forms of the same size were used. The same amount of shavings and sawdust was used, each had the same amount of time to cure after it was taken out of the press before being sawed and turned. The three kinds of glue used were, resin powdered glue, liquid hide glue, and powdered hide glue. The powdered hide glue was made from sifting some bigger flaked hide glue to get fine powder.

Neither the liquid hide glue nor the powdered hide glue cured in the time that the resin powdered glue sample did. The first two were somewhat spongy in comparison with the sample of synthetic lumber in which the resin powdered glue was used.

The final experiment was made with a sample piece of synthetic lumber that had been bonded with resin powdered glue. A sample piece one inch thick and four inches in diameter was used.

This experiment was made as a result of a question asked by a member of an audience before which the writer was demonstrating how to make this material. The question was, "Can you drive nails in this material as you can in regular lumber?" After the demonstration, the writer decided to find out. Two six-penny nails were driven into the one-inch thickness without any signs of splitting. Two nails were driven into the flat surface without splitting, one nail was driven ½ in. from the edge of the sample piece. Finally, a small pilot hole was drilled and a screw was driven into this material without splitting it.

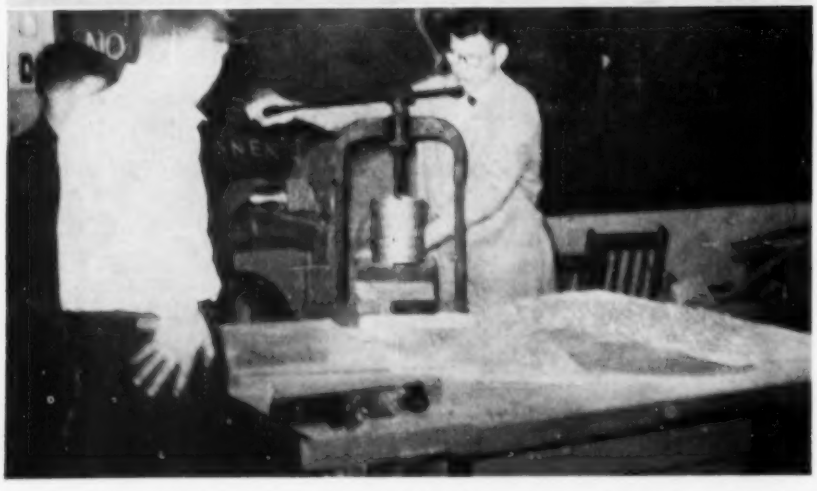
The best mixture the writer has used to date is the following formula:

If a gallon can from the cafeteria is used.
- 2 gallons of planer or jointer shavings
- 1 gallon of sawdust
- 1 lb. 6 oz. Cascamite powdered glue (Urea Resin)

If a proportionate formula is wanted, use 3 parts glue to 18 parts sawdust.

The following plan of procedure seems to be the most satisfactory that has been used thus far.

1. Put 2 gallons of planer or jointer shavings and one gallon of sawdust on the mixing board and mix thoroughly.
2. Measure out the powdered resin glue and mix 2 parts glue to 1 part water.
3. Pour the glue over the sawdust and shavings and mix thoroughly.
4. Fill the form and tamp in by hand.
5. Put the form in the press and press down this mixture. There is now room for more of the mixture.
6. Remove from the press and refill the form.
7. Put the form in the press and press the mixture down again.
8. Repeat this operation until all of the material is in the form.
9. Now, tighten down the press and let the mixture set for at least 72 hours.
10. Remove the form from the press and remove the form from the material and let it cure for 3 to 4 days before turning.



Above: Mixing the sawdust and shavings. Lower: Compressing the sawdust, shavings, and glue

Equipment Needed

There is little equipment necessary for this process. A mixing board is convenient to lay on a bench top. It makes cleaning up any mess an easier job. A piece of plywood or masonite will do.

A press is a necessary piece of equipment. An old book binding press has worked satisfactorily. A vise will do where experimenting is being done with small quantities of material.

A form to put the material in while it is being pressed is a necessary piece of equipment. A gallon can from the cafeteria is satisfactory but the can has to be cut away after the material has been pressed and cured. A form with a draw band is more satisfactory because it can be removed without damage after the material has cured.

Two pieces of scrap lumber or plywood cut to the inside diameter of the form are necessary to press the material. This lumber can also serve for face turning or for turning between centers on the lathe.

Conclusions and Recommendations

From the experience that the writer has gained from experimenting with different formulas and turning them in the lathe, he has drawn the following conclusions.

The writer did not produce the synthetic lumber as cheaply as the woods more commonly found in the woodshop, but the material is to be used for small projects so that the cost is not prohibitive.

This synthetic wood process would fit into a junior high school general shop, arts and crafts, fine arts classes, or the unit woodshop.

This material would be very satisfactory for the first turning project because it has no grain. It would be much safer for the beginning wood lathe operator.

This is something new in the shop with which boys will like to experiment.

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August 19, 1958

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PERSONAL NEWS

(Continued from page 6A)

tor of the Rehabilitation Institute of Metropolitan Detroit.

Dr. Dean has a degree from Wayne State University School of Medicine. He was the Army's assistant chief of preventive medicine in the European Theatre of Operations in World War II.

DR. CARL CLINTON CUMMINS

Dr. Carl Clinton Cummins, formerly professor of industrial arts at San Diego State College, has recently been named the new head of the arts and science division's new technical arts department at the California State Polytechnic College, San Luis Obispo, Calif.

Dr. Cummins is a frequent contributor to educational magazines and a former aircraft industry engineer. A graduate of San Diego High School in 1937, he received his bachelor's degree at the University of California's Santa Barbara campus, and his master's degree at the University of Southern California. He obtained his doctorate from the University of California at Los Angeles.

He has taught at San Diego's Dana Junior High School, San Diego High School, San Diego Junior College, and San Diego State.

His publications have included a survey of *Student Personnel Work in Industrial Arts Teacher Education*, a curriculum guide, a safety guide for the San Diego city schools, and regular contributions to various educational magazines.

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DR. JONES IN NEW ASSIGNMENT

Dr. Walter B. Jones, professor of education and director of vocational teacher education in the School of Education at the University of Pennsylvania, Philadelphia, begins a year's leave of absence in October, 1958, to work as educational consultant with the European Productivity Agency centered in Paris, a branch of the Organization for European Economic Cooperation, successor to the Marshall Plan.

His assignment will be mainly in Italy with headquarters in Rome. His program calls for assisting the Ministry of Public Instruction and other national authorities in preparation of criteria for selecting and training professional staff, determining availability of facilities and suitability of location of proposed teacher education institutions, and advising concerning curricula, libraries, and demonstration materials for instruction.

Dr. Jones will be accompanied by Mrs. Jones and their headquarters will be Rome, Italy.

NEW FACULTY MEMBERS AT STOUT

Six new faculty members have been appointed to the instructional staff of Stout State College, Menomonie, Wis., according to an announcement by Dr. Verne C. Fryklund, president.

The new persons named include Dr. Anna Lee Stensland, assistant professor of English; Dr. Peter F. Christianson, assistant professor of industrial education; Robert R. Bostwick, head coach of football and basketball; Robert J. Melrose, instructor of social science and assistant coach; Gerald Schemansky, instructor of printing; and Gian C. Sud, instructor of biology and chemistry.

A new director of dormitories has also been chosen and an interim appointment made during the convalescence of an injured teacher.

Mrs. Josephine Pierce, former director of dormitories at the Wisconsin State College, Stevens Point, has transferred to Stout.

Glenn D. Tinkham, former superintendent of schools of Marshfield, Wis., has accepted an interim appointment in the department of psychology, in the absence of Dr. E. R. Oetting who suffered injuries in an automobile accident. Mr. Tinkham will teach courses in secondary school administration, and in marriage and the family.

HELSBY RECEIVES APPOINTMENT

Dr. Robert D. Helsby, who received his doctor of education degree from Cornell University on September 23, 1958, has been appointed director of the industrial arts division at State University Teachers College, Oswego, N. Y., as announced by Dr. Foster S. Brown, president.

He was acting director of the division during the 1957–58 college year. He succeeded Dr. Gordon O. Wilber, retired division director, who is now organizing industrial-arts programs in the Philippine Islands. His thesis involved a study of Industrial Arts Division graduates of Oswego from 1925 to 1955.

Dr. Helsby has a diversified background in teaching and administration. As the college's first director of public relations and the first executive secretary of the Oswego Alumni Association, he pioneered programs which have contributed greatly to Oswego's growth and prestige.

He was a member of the first Oswego graduating class to receive the bachelor of science degree in education, the class of 1940. His master's degree was from Ohio State University, granted in 1948. Degree work on the doctorate was taken at Ohio State, Indiana, Pennsylvania State, and Cornell Universities.

Dr. Helsby was a teacher at Cato-Meridian

(Continued on page 18A)

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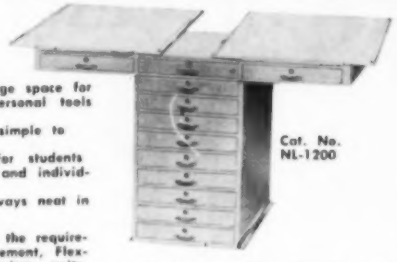

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PERSONAL NEWS

(Continued from page 16A)

Central School from 1940 to 1943. He is a member of Epsilon Pi Tau and Iota Lambda Sigma honoraries. He is a graduate of Gloversville, N. Y., high school.

He was commanding officer of a PT boat in the Pacific Theater in World War II, and during the Korean conflict he was commanding officer of the Oswego U. S. Naval Reserve Unit, recalled to active duty.

DR. WELLS APPOINTED TO HEAD VA MEDICAL EDUCATION SERVICES

Dr. Benjamin B. Wells, director of professional services at the Veterans Administration Hospital in New Orleans, La., has been appointed to head VA medical education services in Washington, D. C.

As director of the education service in the VA Department of Medicine and Surgery, Dr. Wells will be responsible for VA education and training programs involving affiliation with 72 medical and 21 dental schools and training for 2500 residents, 4500 full-time physicians, 800 dentists, 15,000 nurses, and some 10,000 auxiliary medical personnel.

A former professor and dean of the University of Arkansas School of Medicine, he succeeds Dr. John C. Nunemaker, who left VA August 1, 1958, to become Associate Secretary of the American Medical Association Council on Medical Education and Hospitals, in Chicago.

Dr. Wells has been with VA since April, 1957, when he was appointed to the staff of the VA hospital at Hines, Ill. He was transferred to the New Orleans hospital in August, 1957.

Dr. Wells' medical teaching and administrative experience covers a wide field, and he also has been active in medical writing and editing and in research.

News Notes

PEPPER MILL DESIGN

David Remington, Capuchino High School, San Bruno, Calif., was the winner of first prize, a $100 government savings bond in the "Olde Thompson" competition for the best designed and executed pepper mill and salt shaker set, using the company's hardware. Shown with him is his shop instructor, E. A. Hickson.

Pepper mill winner and instructor

The George S. Thompson Corporation, South Pasadena, Calif., offered $350 in prizes in a spring competition. Other winners were Dick Weary, Senior High School, Carlisle, Pa., $50 bond, and Stephen Fields, King City Joint Union High School, King City, Calif., $25

bond. Instructors of the students were given similar prizes.

This company furnishes hardware for many schools with woodworking and design courses, and features especially pepper mill sets which it originated in this country.

CONSTANTINE'S SCHOOL FOR CRAFTSMEN

Albert Constantine and Son, Inc., 2050 Eastchester Road, New York 61, N. Y., are conducting their Eighth Annual Session of Constantine's School for Craftsmen in Veneering, Upholstery, and Wood Finishing.

The four-week course, called "Constantine's Course in Upholstery," began on Saturday, September 27, ending on October 18. This course is presented by Mr. Frank La Morte, instructor and authority on upholstery. This and other courses will be repeated during January and February of next year.

"Constantine's Course in Wood Finishing," now in its eighth consecutive season, is given by Mr. Arthur Egner, chief wood-finishing consultant for the New York Wood Finishers Supply Company.

The first course in wood finishing starts Saturday, October 25 and continues through Saturday, November 15, with morning sessions from 9:30 to 11:30 a.m., and afternoon sessions starting at 1:30 to 3:30 p.m. The second course starts Saturday, November 22 and ends on December 13.

As an added attraction, a two-hour illustrated lecture on the subject of "Veneering" was given by John Docherty of the staff of Albert Constantine and Son, in the Constantine Lecture Hall, on Saturday, September 20. Subjects covered by actual demonstrations are: (1) illustrated demonstration of how veneers are manufactured; (2) types of veneer; (3) preparation of face veneers for gluing; (4) gluing under pressure; (5) gluing of inlaid pictures. It is expected that this course will be repeated in the new year.

ILLINOIS INSTITUTE OF TECHNOLOGY

A unique institute to help meet the need for professionally competent high school mathematics and science teachers has been in operation since September 20, 1958, at Illinois Institute of Technology, Chicago, Ill.

Made possible by a $7,000 National Science Foundation Grant, the Saturday morning in-service institute will enable approximately 50 Chicago area public and private high school teachers to attend classes during the academic year, according to Dr. Haim Reingold, director of the IIT mathematics department who will head the institute.

"The purpose of the institute is to broaden the mathematical background, add to the professional competence, and generally strengthen the mathematical knowledge of the participating teachers," he said.

The program for the first semester, which covers approximately 16 weeks, will involve the basic concepts of mathematics, including the clarification of the fundamental ideas used and taught in elementary and college algebra and in analytic geometry.

Further information may be obtained from *Dr. Haim Reingold, chairman, department of mathematics, Illinois Institute of Technology, Technology Center, Chicago 16, Ill.*

● A No. 6 Little Giant, manufactured by American Type Founders Company, has been installed in the letterpress department of the Southern Institute of Graphic Arts, Nashville, Tenn.

An ATF Chief 15, an 11 by 15-in. offset press, has been installed in the Technical Trade School, Pressmen's Home, Tenn.

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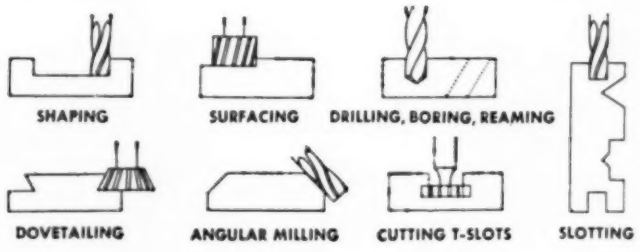
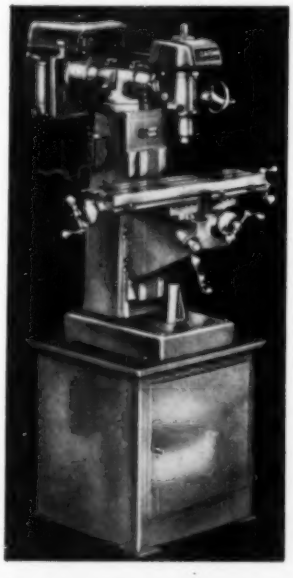


Best of all, they can do *all* these operations with *one* work set-up! The spindle head can be swiveled in a vertical plane and set at any angle, and turret rotated in a horizontal plane, making it possible to mill, drill, bore, ream and shape at all angles without a single change in work setting.

The Clausing – a machine tool widely used throughout industry – is built to rigid standards for efficient operation, sustained accuracy, and long service. For example, there are 7 ball bearings in the head and drive – feed screws have ground threads, turn on ball bearings – bearing surfaces of table, saddle and knee have gibs for lasting accuracy. It has the endurance you want and need.



Investigate this versatile, multipurpose machine tool before investing in *any* mill – it's the *one* mill that can be the busiest machine in your shop! Write for free literature today.

CONDENSED SPECIFICATIONS

Size of Table	6" x 24"
Longitudinal Table Travel	15"
Cross Table Travel	5"
Vertical Table Travel	11 5/8"
Max. Distance Spindle to Column	8 3/4"
Spindle Travel	3"

Spindle Speeds: Six, 180 to 3250 RPM. No. 7 Brown and Sharpe or No. 2 Morse Taper Spindle optional. Operates from ½ to ¾ HP, 1725 RPM motor.

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New Publications

The Game's the Same

By Brigadier Sir John Smyth, BT. Cloth, 104 pp., 5⅛ by 7½ in., illus., $4.75. Philosophical Library, Inc., New York, N. Y.

A fine book for the amateur as well as the more experienced tennis player. It contains much interesting material about the star players, as well as about the play itself.

It is well written and well illustrated.

The book contains seven chapters which offer much to the beginner and the more or less experienced players, under the following titles: the ingredients for success, the grips and the strokes, the singles game, the doubles game, practice makes perfect, court dress and equipment, and the game's the same.

Chamber's Technical Dictionary

Edited by C. F. Tweney and L. E. C. Hughes. Cloth, 1028 pp., 5¾ by 8½ in., $7.50. The Macmillan Co., New York, N. Y.

This is the third revised edition to which has been added a 74-page supplement. It now contains about 60,000 terms taken from 120 branches of scientific and industrial activities.

The supplement contains aeronautical terms dealing with supersonic flight, guided missiles, latest aeroengines, new chemical substances such as drugs, antibiotics, dyestuffs, plastics, weed killers, and insecticides, and also electronic terms used in connection with computers, automation, and color television.

The latest terms used in astronomy and nuclear physics are defined, and recent discoveries regarding chemical elements are tabulated at the end of the book.

This is a book that ought to be on the shelves of all public, scientific, engineering, and research libraries.

Operation of Modern Woodworking Machines

By William F. Holtrop and Herman Hjorth. Cloth, 176 pp., 8⅛ by 10¾ in., illus., $4; paper cover, $2.80. The Bruce Publishing Company, 400 N. Broadway, Milwaukee 1, Wis.

This is a revised edition of Herman Hjorth's *Operation of Common Woodworking Machines*, a standard for beginning and advanced woodworkers for the past 16 years.

William F. Holtrop, associate professor of industrial arts at the University of California, Santa Barbara College, did the revision.

The book describes and illustrates the correct techniques for safe use of woodworking machines found in the professional or amateur shop. The descriptions show the user how the different parts of each machine are interrelated, how they can be set and adjusted to perform certain operations, and how jigs and accessories can be fashioned and used on the machines for special tasks.

Since 1942 the original book has been widely used in school shops and home workshops all over the United States. Mr. Hjorth was a nationally recognized expert in woodworking, and before his death in 1951 he had written six books on woodworking.

A special chapter is devoted to the multipurpose machine. Information directed toward good safety habits in the use of power tools is to be found in every chapter.

A native of Holland, William Holtrop is also recognized as an authority in woodworking. He is the author of *Vocational Education in the Netherlands* and *Woodshop Tool Maintenance*. His articles have appeared frequently in *Industrial Arts and Vocational Education* and other educational publications. A graduate of Teachers College, Kearney, Neb., with a master's in education from the University of Missouri and a doctorate from the University of California, Mr. Holtrop has had 20 years of experience as a woodworking teacher.

A key is available for teacher use.

Automotive Essentials — Revised Edition

By Ray F. Kuns. Cloth, 502 pp., 6¾ by 9½ in., illus., $6.50. The Bruce Publishing Co., 400 N. Broadway, Milwaukee 1, Wis.

This is a textbook for the beginner and a manual for the auto owner who wants to know enough about his car to do an occasional repair job.

The author is an automotive expert who has been writing and editing automotive books and technical magazines for 30 years. He founded the Cincinnati Automotive and Aviation High Schools and was supervisor and co-ordinator of all national defense training in Cincinnati public schools during World War II.

Mastery of the material in the new and revised edition of *Automotive Essentials* will put the student or the reader in a position to select and intelligently use and repair automobiles and automotive equipment. Automobile parts and units representative of basic design are illustrated in the many photographs and line drawings in the text.

The initial chapter introduces the car as a unit and breaks it down into minor units. Following chapters discuss all the parts that make up a unit until each essential part has been illustrated and discussed.

(Continued on page 22A)

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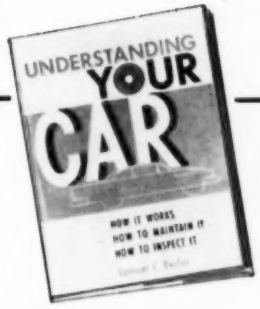

FEATURE BOOK FOR THE MONTH

UNDERSTANDING YOUR CAR

#82 By Bealer

A brand new book, written especially for prospective, and new drivers of Junior High age. It gives the student basic information about the automobile – how it works, how to use and maintain it. Its 123 pages are organized into sections on (1) The Body, (2) The Chassis, and (3) General Information. Students "learn to do by doing" the 24 jobs that are outlined for easy completion. Each job includes a section on tools and equipment, procedure, suggested discussion subjects, references, and questions to direct study and stimulate thought. Ideal for shop text or reference – and use in Driver's Training. List price, $1.60

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NEW PUBLICATIONS

(Continued from page 20A)

Two chapters are devoted to outboard motors, motorcycles, motor bikes and scooters. Operating principles and maintenance of the two- and four-cycle lightweight engines, generators for producing lights and ignition spark, power transmission systems, suspension systems, and magnetos are explained.

New chapters are included on troubleshooting and maintenance, purchasing new and used cars, and selecting the right insurance coverage.

Also new is a chapter on the new European cars that have captured the American public and a chapter on the history of the automobile.

Physics Problems and How to Solve Them

By Clarence E. Bennett. Paper, 240 pp., 5¼ by 8¼ in., illus., $1.75. Barnes & Noble, Inc., New York, N. Y.

This text gives the high school student of physics a thorough understanding of the science he is studying and of the problems which arise and the method that is to be followed in solving them.

The five parts into which the book is divided present many problems which the student will meet in his study of mechanics, properties of matter and sound, heat, electricity, and magnetism and light.

New Practical Sign Painting

By Robert E. Owen. Cloth, 182 pp., 6¼ by 9½ in., illus., $4.95. The Bruce Publishing Co., 400 N. Broadway, Milwaukee 1, Wis.

The author of this book is a successful commercial sign painter who has owned and operated a sign shop for the past 25 years.

This revised edition of his earlier book, *Practical Sign Painting*, had gone into a second printing. It will be found useful by both the amateur and the experienced sign painter who wants to improve his skills and add to his knowledge of business methods in the sign-painting industry.

The new book includes valuable chapters on price estimates, sign layouts, paints, construction and erection, brush materials with suggestions on care and cleaning, and an expanded index offers tips for the amateur and professional sign painter on shop management.

Introduction to Foundry Technology

By D. C. Ekey and W. P. Winter. Cloth, 296 pp., 6⅛ by 9¼ in., illus., $7. McGraw-Hill Book Co., Inc., New York, N. Y.

This text contains notes arranged for 15 lectures and 16 job sheets to fill the need that exists for a book on the introductory level aimed at giving engineering students a course on foundry technology.

The lectures give the student a good picture of the casting process, an understanding of sand molds and cores; the materials used and how they are tested; the use of patterns; permanent molds and die-casting methods; centrifugal castings, investment casting, and the shell-molding process.

The lectures also describe molding machines and mechanization and automation of foundry operations. They also give the student an idea of the metallurgical considerations of the ferrous alloys and the influence of alloying elements and nonferrous alloys, and how castings are cleaned and inspected.

The book also contains a list of suggested audio-visual aids.

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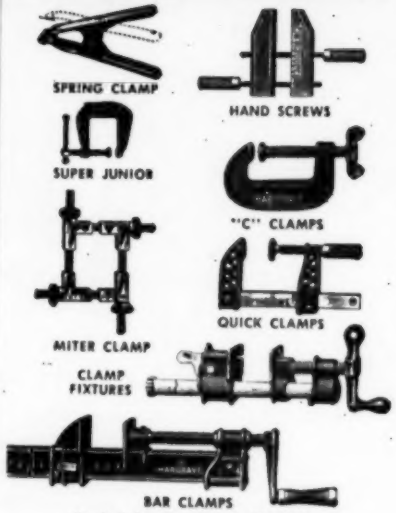

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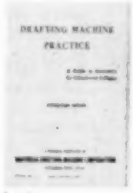

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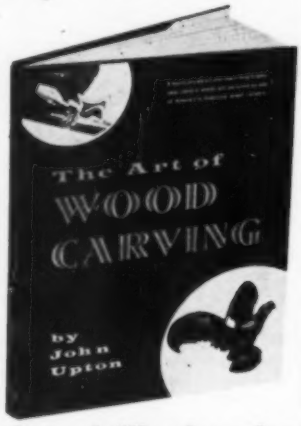

The Art of Woodcarving

by John Upton

This inspiring guide to a simple and inexpensive craft can turn your young whittlers into accomplished artists! In answer to innumerable requests, a leading American woodcarver has set down in clear terms the tools, techniques and steps necessary for a beginner to turn out an expertly finished creation in wood. Pages of photographs and helpful diagrams make every step easy and offer fascinating design ideas.

Chapters cover the reason for using wood, the woods best suited for carving, the few simple tools and how to use them. They explain how to draw your plan, how to construct the various parts and glue them, how to do rough and detail carving. An interesting chapter shows how to make carved panels for the home, and carvings on various household objects. The book concludes with a section on polychroming, gilding and staining. 144 pages $5.50

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Descriptive Material

CATALOG ON POLYETHYLENE AND NYLON PRODUCTS

The General Scientific Equipment Company have made available their new 20-page Catalog G 358, which covers polyethylene and nylon products, not affected by concentrated acids, oxidizing agents, hydroxides, and polar liquids. The catalog illustrates and describes 95 products. Technical properties are discussed in their relation to this new development in acid resistant ware for laboratories and industries.

(For further details encircle index code 0913)

KODAK BOOK ON MAGNETIC SOUND

Addition of magnetic sound tracks to 16mm. motion pictures, from script preparation and simple commentary-type narration to lip-synchronization, is fully described in a new publication, "Magnetic Sound Recording for 16mm. Motion Pictures."

Published by Eastman Kodak Company as a guide to potential users of magnetic sound motion pictures — businessmen, educators, industrial photographers, or amateur cinematographers — the 68-page publication covers all the facets of preparing magnetic sound-on-film movies.

Sections in the book discuss basic equipment for making sound motion pictures, script preparation, camera techniques when shooting for sound, basic recording techniques, use of the microphone in recording, narrating, requirements of a recording studio, editing for and with sound, obtaining optical prints from magnetic sound films and the care and handling of magnetic sound films.

"Magnetic Sound Recording for 16mm. Motion Pictures" was written with the assistance of noted 16mm. movie-maker Professor Glen H. Turner of the Brigham Young University College of Fine Arts.

The book is fully illustrated with photographs and diagrams, and is available through Kodak dealers.

(For further details encircle index code 0914)

BOICE-CRANE CATALOG

The recently announced belt sander is one of the new tools fully described and illustrated in the 52-page catalog just issued by the Boice-Crane Company.

Full details are included on a line of band saws, contour saws, and band filers, jig saws, saw jointers, saw tables, shapers and shaper cutters, drill presses, tool and knife grinders, jointers, lathes, planers, belt and spindle sanders, spinning tools, motors, controls, supplies, and accessories.

Write for Catalog No. 58.

(For further details encircle index code 0915)

ELECTRONICS CATALOG

Allied Radio Corporation announces the fall release of its new 1959 catalog — No. 180 — featuring an unusually large selection of electronic parts and equipment for use in schools, classrooms, laboratories, and shops. The 1959 edition consists of 452 pages (208

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pages in rotogravure and 4-color covers), and lists over 32,000 items. Of special interest to teachers and other school personnel is the greatly expanded section on training kits, recording and test equipment, books, diagrams, parts and tubes, and other equipment required for radio and electronic training activities.

The 1959 Allied electronics catalog is available without charge.

(For further details encircle index code 0916)

Business and Personal News

NEW BLACK & DECKER SALES WAREHOUSES

As part of a continuing program to better serve its customers in Mexico, the Black & Decker Manufacturing Company announces the opening of a new sales warehouse in Mexico City.

Jesus Mendoza will continue in the capacity of Black & Decker's Mexican sales manager. He joined the organization in Mexico in 1947.

To better serve its customers throughout Southern Africa, the Black & Decker Manufacturing Company has opened a new sales warehouse in Capetown, South Africa, on September 2, 1958.

William Hare has been appointed sales director of Black & Decker South Africa (Pty.) Ltd. He was formerly the company's sales representative in the Cape area.

Black & Decker maintains additional warehousing facilities in Australia, Belgium, Canada, and England.

KODAK OFFERS NEW SERVICE

Eastman Kodak Company have inaugurated a new service that enables users of Kodachrome Film to mail their exposed film directly to a Kodak laboratory for processing and to have it returned directly to them by first-class mail.

The service is based on the use of a special mailing bag customers may purchase through Kodak dealers. Various bags are available to provide prepaid processing for different types and sizes of Kodachrome 8mm., and 16mm., films for movie cameras and 35mm., and 828 film for miniature cameras.

Kodachrome Film in these bags will be accepted for processing by Kodak laboratories in the United States, Europe, Africa, Asia, Australia, Canada, and Mexico.

In use, the new Mailers are utilized in the following way:

1. Customers place their exposed Kodachrome Film in original Kodak movie film carton or still film metal can.
2. This they place in the appropriate Mailer for that film, secure clasp, and add postage.
3. They address the envelope Mailer to the nearest of ten Kodak Processing Labs listed on Mailer, and add their return address.
4. They retain the film record stub with serial number proving they paid for processing.
5. They drop Mailer into nearest mailbox, wherever they may be.

After processing, Kodak returns the film directly to the customer by first-class mail.

In addition to the new service, Kodak continues to provide its earlier Kodachrome processing services in which the dealer handles delivery of the film to the Kodak Processing Laboratory and return of the film to the customer.

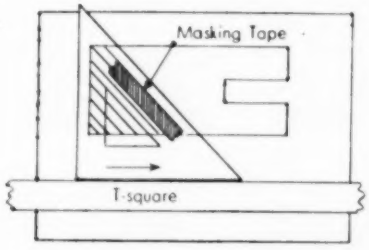
DRAFTING TIPS

For faster cross-hatching

Here is a simple, fast method for drawing cross-hatched lines with accurate uniform spacing.

Place a piece of draftsman's masking tape on a triangle, so that an edge of the tape is parallel to an edge of the triangle. The distance between the edge of the tape and the edge of the triangle should be the desired distance between the cross-hatched lines.

Begin from the bottom of the cross-hatched section, by sliding the triangle until the edge of the tape coincides with the first cross-hatched line. Draw the next cross-hatched line along the triangle edge. Again slide the triangle until the tape edge coincides with this new line. This procedure is repeated until the entire area is cross-hatched.



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The POST Big Bow Combination Compass is about as close as you can come to having an "all-purpose" drawing instrument.

You can draw circles from 3/16" of an inch in diameter up to 13 inches in diameter. If you add beam bars you can increase the diameter all the way to 26 inches. For complete flexibility the 890 NBC is equipped with inter-changeable attachments so that it may be used as a divider, or pencil or pen compass. With the addition of a ruling pen handle, the compass pen attachment can be adapted as a ruling pen for straight line ink work. The Big Bow is listed as 890 NBC. It is a precision crafted instrument which combines great versatility with the highest quality.

Post Warranty of performance and workmanship is unique

In addition to unconditionally guaranteeing that all POST instruments are free from faulty workmanship and defective materials, the POST Warranty offers a truly unique plus value. Included with each Warranty is a parts list for each instrument in the set purchased. These parts lists make it easy to replace worn or lost parts. Instructions on how to care for each instrument are also included.

For complete information on the Big Bow 890 NBC or the Post Warranty write the Educational Sales Division, Frederick Post Company, 3648 North Avondale Ave., Chicago 18, Illinois.

POST

SENSITIZED PAPERS & CLOTHS • TRACING & DRAWING MEDIUMS • DRAWING INSTRUMENTS & SLIDE RULES
ENGINEERING EQUIPMENT & DRAFTING SUPPLIES • FIELD EQUIPMENT & DRAFTING FURNITURE

Shop Equipment News

STANLEY'S NEW ROUTER LINE

Two new heavy-duty electric routers incorporating the most advanced design features have been announced by Stanley Electric Tools, a division of The Stanley Works.

The two routers (H264) a 7/8-h.p. with a speed of 23,000 r.p.m., and (H267), a 1¼-h.p. with a speed of 27,000 r.p.m., have such advanced features as a spotlight for illuminating the working area, eliminating eyestrain and squinting when the operator does free hand sign routing or intricate patterns; a safe switch-shaft lock with a three-position recessed switch that starts-stops router and automatically locks shaft; one wrench only to change bits and cutters in perfect safety; a quick clamp with positive hold, simple, safe, and convenient, which allows a clamping lever to hold or release the motor in router base with a flip of the finger (more than 1000 lb. of pressure at finger tips); a new micrometer depth adjustment — a new concept for quickly and easily setting the depth of cut with precision accuracy — depth of settings can be as fine as 1/64 of 1/64 (.004) inches or less; also three-position grip handles for all sized hands, for all types of routing jobs.

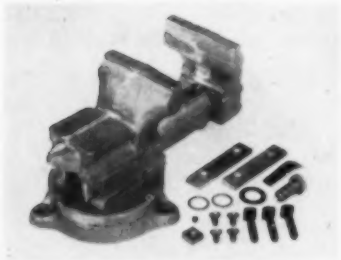
Stanley's New Router

Other features include brush holders provided with a special window to inspect carbon brushes; a cantilevered type base that affords excellent visibility and more wrench room; sealed precision ball bearings, cord in an upright position to keep it away from the routing area. Air vents cool the motor and blow chips away from the bit and routing area.

Companions to the new routers are two powerful planes, router kits, router plane kits, and accessories.

(For further details encircle index code 0901)

B-G Leads the Way in NEW PRODUCTS

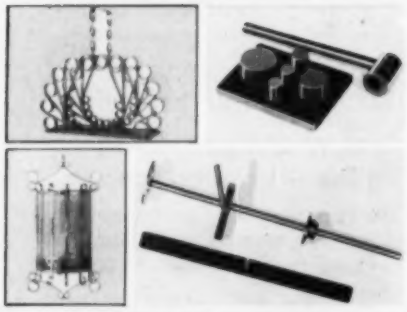


PROJECTS

Illustration shows Unfinished Vise Kit SR-44, which when completed gives the student a sturdy 3" bench vise. It is an excellent project for teaching many varied operations in the machine shop. Illustrated step by step instructions included with each kit. $7.50

TOOLS

This Artisan Bender (A) and Twister (B) (illustrated with two of the many interesting items they make) are two unique tools that make it possible to obtain uniform bends and twists in light metal bars. Excellent for crafts as well as metal shops, they stimulate the student's imagination for design and creation of his own projects. $15.00



EQUIPMENT

A multiple unit Drawing Table WD-23, complete with drawers and storage space for 6 drawing boards. The drawer and board storage units are removable so that the table can be furnished alone or with either unit or both. Price ranges from $52.00 for table only to $124.00 for the table with both storage units.

Over 50 Years Serving the School Shops of America

BRODHEAD GARRETT CO.
4560 East 71st Street • Cleveland 5, Ohio

NEW DELTA "SUPER 900" RADIAL SAW

Delta Power Tool Division of Rockwell Manufacturing Company has introduced a powerful 9-in. radial saw, which is designed and priced for general woodworking in all industries.

Called the "Super 900," the machine is economical, and offers sufficient capacity for the general woodworking required in the making of shipping crates, pallets, storage shelves, and maintenance work. It may also be used for light construction work in woodworking and furniture making, and in metalworking production operations for such jobs as cutting sheeting, tubing, extrusions, etc.

New Delta "Super 900" Radial Saw

Incorporated on the Delta "Super 900" are the many exclusive features of previous models. Complete versatility enables the new radial saw to be quickly converted to do dadoing, molding, tenoning, drilling, shaping, grinding, sanding, etc.

The new saw has a crosscut capacity of 15

(Continued on page 28A)

CORRESPONDING CODE INDEX NUMBERS TO BE ENCIRCLED CAN BE FOUND ON THE CARDS IN THE READER'S SERVICE SECTION

MAYLINE

The Best in Tables for Drafting or Art

For a requirement covering both drafting and art, there is the C-7702 table, attractively priced. Base is oak. Top is Basswood. Send us your requirements for our quotation.

For the complete drafting table choose the Mayline C-7703-B table. This offers a fine Basswood drawing top with metal edges, 6 individually and master keyed, roomy, equipment drawers, and a 6 compartment drawing board storage unit. Complete table reasonably priced. Mail us your bids.

Symbol of MAYLINE Superiority

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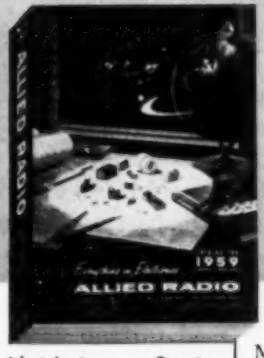
623 No. Commerce St.
Sheboygan, Wisconsin

C-7703B Drafting Table

MAYLINE

MAYLINE MAYLINE

everything in electronics for the SCHOOL



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high-quality tools by Greenlee

for accurate shopwork

The minute you take hold of a GREENLEE tool, you can "feel" the fine quality and extra craftsmanship that go into its making. All GREENLEE tools are carefully formed and finished for accuracy and correct cutting edges. All are properly heat-treated for strength and long life.

GREENLEE 22 SOLID-CENTER AUGER BITS bore *accurate* holes smoothly, quickly. Solid-center design gives extra strength and provides fast, positive chip clearance. Every GREENLEE 22 Auger Bit has accurately sized, perfect cutting edges that last through long use. "Plastic Sealed" to reach you factory-sharp. Available in 18 sizes: from 4/16" diameter through 24/16". Buy singly or in sets . . . in handy plastic rolls, steel boxes, or metal holding panels.

CHISELS, GOUGES Various types of tang butt, socket butt and firmer chisels. All are carefully balanced, easy to hold. Blades are of selected tool steel that long retains its fine-cutting edge. Green plastic handle provides comfortable, sure grip. Buy singly or in sets. GREENLEE socket gouges available with inside and outside bevels . . . same top quality as all GREENLEE tools.

TOOLS FOR CRAFTSMEN
GREENLEE

The GREENLEE tool line also includes expansive bits, electric drill bits, turning tools, drawknives, and many more. Write for literature. Greenlee Tool Co., 2031 Twelfth St., Rockford, Ill.

SHOP EQUIPMENT NEWS

(Continued from page 26A)

in., and will rip to the center of a 48-in. panel. Maximum depth of cut is 2½ in., and dado capacity is 13/16 in. wide with a 6-in. dado. The 1-h.p. motor has an integral overload reset button, lubricated-for-life bearings and dual 115/230 voltage. Full load motor speed on 60-cycle current is 3450 r.p.m.

(For further details encircle index code 0902)

NEW MOUNTING TEMPLATES FOR WOODWORKERS' VISES

The Columbian Vise & Mfg. Company have announced their new mounting templates, to simplify woodworkers' vise installations.

Furnished with each Columbian series 7 and 10 woodworkers' vise, templates permit predrilling of benches and partial placement of bolts before vises are located. Employed in conjunction with the new Columbian 3-point mounting of 2 slotted brackets and a center rest, they cut installation time by at least 50 per cent. Their use is also reputed to assure firm, tight fastening, easy operation, and longer life.

When mounted, top of vise jaws is approximately ⅛ in. below bench top. Consequently, top edge of the bench will help to keep tools from striking metal jaws of vise. Bench top can be refinished without removing and remounting vises.

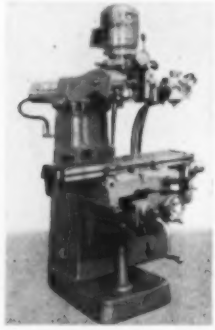
Instructions for using are printed right on templates, eliminating possibility of error. An added feature, on the back of the template sheet, is a list of suggestions for proper vise care and efficient operation.

Template copies and "vise maintenance hints" may be secured.

(For further details encircle index code 0903)

NEW CONTOURMASTER MILLING MACHINE

The Cincinnati Milling Machine Company recently announced their new Contourmaster Milling Machine, equipped for three-dimensional hand guided hydraulic tracer controlled milling. This new machine, designated 1C, retains the basic advantages and design characteristics of the 1A and 1B styles introduced



Contourmaster Milling Machine

at the last machine tool show. The principal difference is in the type of tracing equipment: vertical automatic depth control to the spindle for the 1A and 1B styles, and 3-D hand guided hydraulic tracing for the 1C style.

The new 3D unit controls the direction of traverse of the table and saddle for 360-deg. horizontal profiling, and the vertical movement of the spindle quill for vertical profiling. Deflection of the stylus results in a corresponding movement of the table, saddle, and spindle quill; separately or in unison. Hydraulic motors perform the actual work of traversing the saddle and table units through feed screws engaging antifriction nuts. Three-hundred sixty-deg. horizontal feed rates, within the limit fixed by a knurled adjusting dial above the tracer finger, are controlled by the amount of tracer finger displacement. A maximum of 25 in. per min., may be obtained. When the tracing unit and quill are in the fully retracted position, a rapid traverse rate of 50 in. per min., is available for positioning the table and saddle. The conventional handwheel controls can also be used for positioning. A vertical feed adjusting dial, also above the tracer finger, determines the maximum "down" feed rate of the spindle. This feature is useful when machining hard, tough metals.

In all, four distinct combinations of feed movements are available on the new Cincinnati 1C Contourmaster.

Power feed in a straight line, using the table or cross traverse, can also be engaged without constant hand deflection of the tracer finger. The device for this feature, mounted on top of the 3-D unit, holds the tracer finger in any desired deflected position. A control now engages and disengages the mechanism.

In one setting, the full 22-in. table travel and 10-in. cross travel can be used for 360-deg. hand guided profile milling cuts. Ram mounting of the spindle carrier permits the milling of work wider than 10 in. in two settings. Vertical range of the spindle quill is 3½ in. A one h.p. motor drives the spindle. There are eight speeds, 215 to 5650 r.p.m.

Additional information may be obtained from the Cincinnati Milling Machine Company. Ask for their Publication No. M-2008.

(For further details encircle index code 0904)

KNIGHT-KIT 18-WATT AMPLIFIER

Allied Radio Corporation announces the release of its new Knight-Kit 18-Watt Amplifier in kit form. Highlighted by the use of an exclusive printed circuit switch and two printed circuit boards, construction is greatly simplified for kit builders since most of the complex wiring is already completed. Low in cost, and with a full set of controls, this unit has many features worth noting by the budget-minded hi-fi fan.

Knight-Kit 18-Watt Amplifier

Employing RCA's new 6973 audio output tubes, specifically designed for high-fidelity circuits, the Knight-Kit amplifier delivers a full 18 watts output at only 0.5 per cent distortion. Hum level is better than 60 db below rated output and frequency response at 18 watts is plus or minus 1 db, from 20 to 30,000 cycles.

Eight inputs are provided on the amplifier, for every possible signal source, including NARTB-equalized tape head input. A total of seven record equalization settings are offered, plus tape head equalization. Other controls include separate bass and treble tone controls, and on-off volume.

The metal case housing the amplifier is styled in French gray and ebony black to harmonize with other Knight-Kit high-fidelity units. Size is a compact 4 in. high, 13 in. wide, and 8 in. deep. Supplied complete with case, all parts, wire, solder, and tubes. Instructions included, also wall-size diagrams and schematic drawings.

Stock number of the Allied Knight-Kit 18-watt amplifier kit is 83 YX 786.

(For further details encircle index code 0905)

CORRESPONDING CODE INDEX NUMBERS TO BE ENCIRCLED CAN BE FOUND ON THE CARDS IN THE READER'S SERVICE SECTION

BLACK & DECKER DRUM VACUUM CLEANER

The Black & Decker Manufacturing Company has introduced a new Heavy-Duty Vacuum Cleaner for top-capacity vacuuming or material recovery. The unit attaches to any standard open-head 55-gallon drum to give

Drum Vacuum Cleaner

a full pickup capacity of 48 gallons dry or 40 gallons wet material. It is powered by a special B & D-built 1¼-h.p. vacuum cleaner motor, sealed against dirt and water, which drives a 2-stage turbine-type centrifugal fan.

This heavy duty drum vacuum cleaner is easily fitted with any of Black & Decker's complete line of vacuum cleaner attachments for large-capacity vacuuming or furnace cleaning.

An accessory steel dolly has also been introduced to further speed emptying and add convenient mobility with minimum effort.

(For further details encircle index code 0906)

NEW KODAK PROJECTION SCREEN

Eastman Kodak Company announces a new glass-beaded, 40 by 40-in. Kodak Projection Screen, which because of its square size, can be used for both movie and slide projection.

Screen and stand are cleverly combined so that the two together are only a little larger than the screen's metal case.

A steel rod fits into a swivel-type bracket at the base and a curved bracket supports it for table-top use. Rubber tips on the stand permit the screen to be used without damage to furniture or floors.

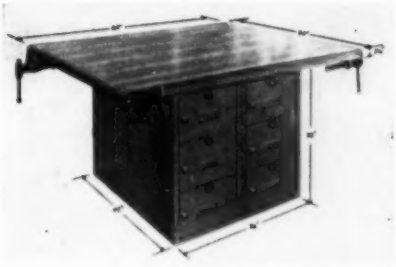
Because of the spring-loaded roller, the screen can also be used from a wall or ceiling if desired.

(For further details encircle index code 0907)

STOR-MOR 4-STUDENT BENCH

The Tolerton Company announces the production of the 4-student Stor-Mor Bench, TM-12 FA, with 50 per cent more horizontal project floor locker storage space.

Heavy gauge steel base consists of 12 individual lockers (6 each side) numbered one to six, ball point fasteners and mating pulls



Stor-Mor 4-Student Bench

and lugs for padlocks. Available in baked green or gray enamel.

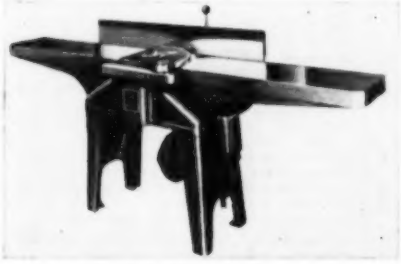
Exclusive 100 per cent laminated Northern hard maple top features steel splines on sides and 3/8-in. through bolts which eliminate bowing or sagging.

Further information available.

(For further details encircle index code 0908)

NEW JOINTER — MODEL J-139

The Yates-American Machine Company announces production of a newly designed, 12-in. jointer, Model J-139. The new jointer is a



New Jointer Model J-139

heavy-duty belt drive machine featuring solid cast iron construction and maximum safety features throughout.

A massive 8 ft. by 12-in. table provides sturdy support for heavy production. Cutterhead knives can be individually adjusted. The machine is available less motor and switch, or with magnetic starter and 5-h.p. motor. Bulletin available on request.

(For further details encircle index code 0909)

NEW STARRETT NO. T465 MICROMETER HEAD

The L. S. Starrett Company have introduced the new Starrett No. T465 Micrometer Head which is designed for use in electronic equipment requiring ultra-fine adjustment and for machine tools, fixtures, special gauges and tools where micrometer accuracy in settings and adjustment is required.

This new micrometer head reads directly in ten-thousandths of an inch and has a 1-in. range. An important feature is a new constant-pressure nut (patents pending) which makes possible a wide range of tension adjustment from light to heavy to suit requirements. The thimble is 2 1/8-in. in diameter and has widely spaced direct-reading "tenth" graduations permitting easy adjustment and reading for close accuracy.

Other precision features are: quick reading graduations with every thousandth numbered, no-glare satin chrome finish on thimble and sleeve, one piece hardened spindle with threads

(Continued on next page)

NOW! *a Whiteprinter for Schools*
THAT WILL EARN AS STUDENTS LEARN!

It was designed with schools in mind! Compact Bruning Copyflex Model 300 provides all the versatility and big printing width of a large, expensive diazotype reproduction machine—at a price to fit school budgets.

As Students Learn. Now your engineering and drafting students can make and see their own prints of their class projects. Right in the class room, they can make sharp, black-on-white diazotype prints in seconds of a drawing or tracing up to 30-inches wide by any length. They gain valuable experience with all of the drafting and reproduction techniques involved with such materials as intermediates and film overlays.

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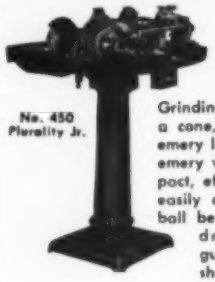
TOOLS ALWAYS SHARP WITH PLURALITY OILSTONE TOOL GRINDERS



No. 450 Plurality Jr.

NOW AVAILABLE IN 3 SIZES
No. 425 Plurality Sub Jr.
No. 450 Plurality Jr.
No. 475 Plurality

Grinding can be done on a cone, coarse or fine or emery leather stropping or emery wheels. Unit is compact, efficient, serviceable, easily accessible and has ball bearing direct motor drive. Especially guarded for school shop use. Details on request.

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Originators and Pioneer Manufacturers of Oilstone Tool Grinders

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29 EAST McWILLIAMS ST.
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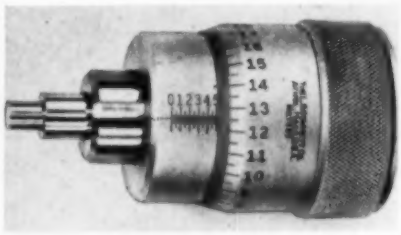
SHOP EQUIPMENT NEWS

(Continued from previous page)

ground from the solid and stabilized, and Hi-Micro Mirror-Lapped Finish on end of spindle.



No. T465 Starrett Micrometer Head

Overall length at zero is 4⅛ in.; thimble diameter is 2⅛ in.; length of clamping surface, 9/16 in.; diameter, 1 in.; length from

(Continued on page 32A)

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ELIMINATE ALL TABLE SAW HAZARDS

with **BRETT-GUARD** New Visual Safety Tool!

Unlimited visual protection. Fingers can't touch blade. New, patented all-purpose BRETT-GUARD combines saw safety with full work visibility — for any type saw table, with blades 6" to 22". Made with see-thru Pexiglas. Fully adjustable to any size cuts. Protects operators where no other saw guard will function. • Now specified by leading industrial firms, government, schools, etc. Send today for details. 30-DAY FREE TRIAL. Specify make, model, and blade size. Ask about latest BRETT-GUARD for Jointers! 16MM Sound Film available, free loan.

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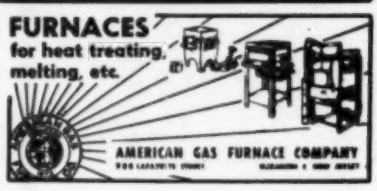

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Knockdown units made of genuine Tennessee aromatic red cedar and other woods

New 4-color catalogue offers dozens of challenging "do-it-yourself" items

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GILES & KENDALL CO.
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SHOP FURNITURE FOR 1958 SHOPS

1. Four-Station Workbench for high schools with built-in tool cabinets, sliding doors to lockers.
2. Workbench for junior high schools with or without tools and storage space for tools.
3. Four-Station Workbenches with tools for elementary schools and a naval saw-bench.
4. Four-station drafting and planning table with storage for all drafting equipment.
5. Wall-tool Cabinets and Bench-Tool Cabinets.
6. Metal Working Benches, sheet-metal Benches and Stake-plate Bench with concealed storage for stakes and machines.
7. Anvil Base with storage for anvil tools.
8. DeLuxe Drafting Table with complete equipment storage including T-squares and boards.

GO MODERN! USE SHOP FURNITURE DESIGNED FOR HANDLING LARGER CLASSES WITH LESS DISCIPLINE PROBLEMS.

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STONER WOOD PRODUCTS CO.
CHARLESTON, ILLINOIS

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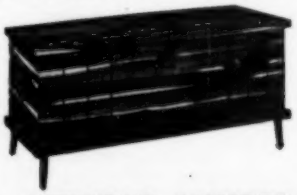

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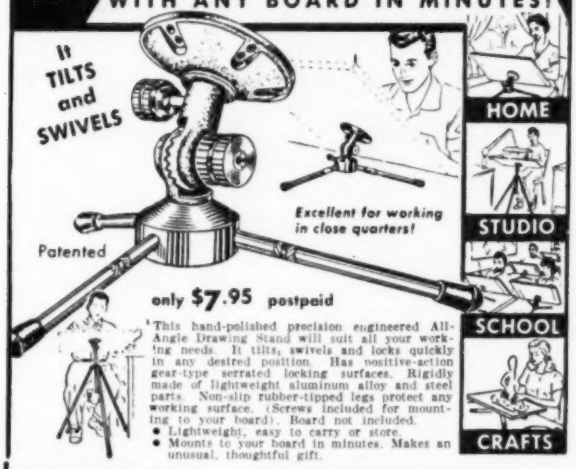
ARTISTS need this *NEW* DRAWING STAND

The Safe-Lock

MAKES AN ADJUSTABLE DRAWING TABLE WITH ANY BOARD IN MINUTES!



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This hand-polished precision engineered All-Angle Drawing Stand will suit all your working needs. It tilts, swivels and locks quickly in any desired position. Has positive-action gear-type serrated locking surfaces. Rigidly made of lightweight aluminum alloy and steel parts. Non-slip rubber-tipped legs protect any working surface. (Screws included for mounting to your board). Board not included.

- Lightweight, easy to carry or store.
- Mounts to your board in minutes. Makes an unusual, thoughtful gift.

FLOOR MODEL #714 — adjusts for sitting or standing (raises or lowers). Folds flat for storage in seconds. **$14.95 postpaid**

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Please ship immediately:
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Name .....
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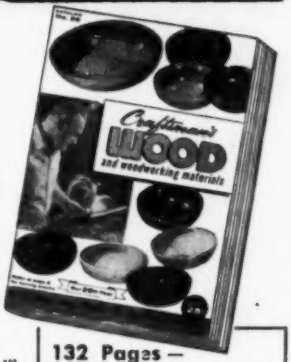

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(Continued from page 30A)

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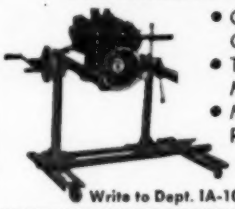

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(For further details encircle index code 0911)

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(For further details encircle index code 0912)

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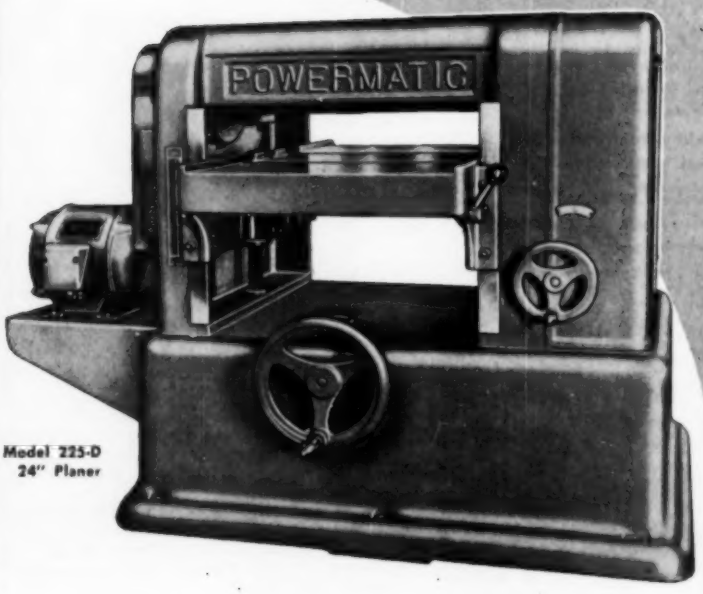

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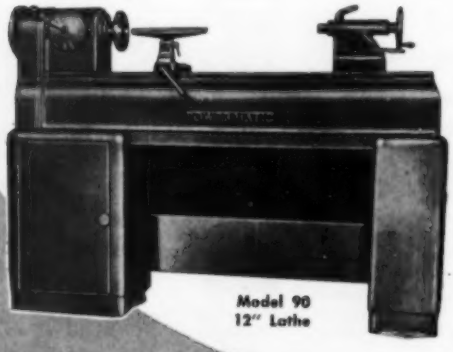

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November, 1958

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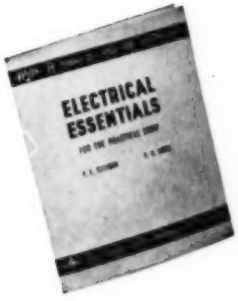

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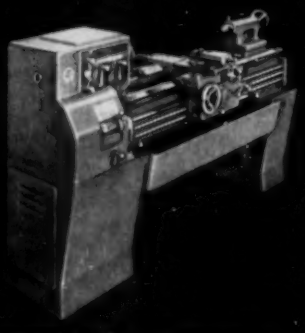

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